

R E P O R T R E S U M E S

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LEARNER CHARACTERISTICS AND INSTRUCTIONAL MODE--THE  
RELATIONSHIP OF ANXIETY, COMPULSIVITY, CREATIVITY, AND  
EXHIBITIONISM TO SUCCESS IN LEARNING FROM PROGRAMED AND  
CONVENTIONAL INSTRUCTION. FINAL REPORT.

BY- RIPPLE, RICHARD E. AND OTHERS  
CORNELL UNIV., ITHACA, N.Y.

REPORT NUMBER CRP-2425

PUB DATE JUL 67

REPORT NUMBER BR-5-1048

CONTRACT OEC-5-10-005

EDRS PRICE MF-\$1.25 HC-\$11.28 280P.

DESCRIPTORS- \*PROGRAMED INSTRUCTION, CONVENTIONAL INSTRUCTION,  
\*INDIVIDUAL CHARACTERISTICS, ANXIETY, CREATIVITY, SEX  
DIFFERENCES, INTELLIGENCE DIFFERENCES, ACHIEVEMENT TESTS,  
\*EXPERIMENTS, \*ANALYSIS OF VARIANCE, RELIABILITY, TEST  
VALIDITY, GRADE 8

GOALS OF THIS STUDY WERE TO DETERMINE THE INTERACTIONS  
BETWEEN EACH OF FOUR PERSONALITY CHARACTERISTICS (ANXIETY,  
COMPULSIVITY, CREATIVITY, AND EXHIBITIONISM), SEX,  
INTELLIGENCE, AND ACHIEVEMENT (BASED ON COMBINED TEST SCORES  
OF RECALL, TRANSFER, AND GENERATION OF HYPOTHESES) FROM  
PROGRAMED INSTRUCTION AND CONVENTIONAL INSTRUCTION. A YEAR OF  
EXTENSIVE PILOT STUDIES, INCLUDING RELIABILITY AND VALIDITY  
CHECKS, INVOLVED ABOUT 5000 GRADE 8 STUDENTS. THE EXPERIMENT,  
ALSO ONE YEAR IN DURATION, INVOLVED 1100 STUDENTS IN GRADE 8  
CLASSES, FROM 22 SCHOOLS WHICH WERE EQUATED ON INTELLIGENCE  
AND SEX AND ASSIGNED AT RANDOM TO EITHER PROGRAMED OR  
CONVENTIONAL INSTRUCTION IN VOCABULARY DEVELOPMENT (WORD  
MEANING AND USAGE). PRE-TESTS RATED STUDENTS ON THE FOUR  
PERSONALITY CHARACTERISTICS, AND INTELLIGENCE. FOUR-WAY  
ANALYSIS OF VARIANCE WAS PERFORMED TO TEST ALL POSSIBLE  
INTERACTIONS, AND THE SCHOOLS SERVED AS REPLICATES IN THE  
ANALYSIS. NO INTERACTIONS PERSONALITY TRAITS, SEX, OR  
INTELLIGENCE WITH INSTRUCTIONAL MODE WERE STATISTICALLY  
SIGNIFICANT. THESE RESULTS WERE DISCUSSED IN TERMS OF  
INSTRUMENTS, DESIGN, AND ANALYSIS TECHNIQUE. (LH)

EDU 16280

BR-5-1048  
PA 24 A

EM004054

**FINAL REPORT**

**Project No. 2425**

**Contract No. OE-5-10-005**

**LEARNER CHARACTERISTICS AND INSTRUCTIONAL MODE:**

**The relationship of anxiety, compulsivity, creativity,  
and exhibitionism to success in learning from  
programed and conventional instruction**

**July, 1967**

**U.S. Department of  
HEALTH, EDUCATION, AND WELFARE  
Office of Education  
Bureau of Research**

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**Programed and Conventional Instruction**

**U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE  
OFFICE OF EDUCATION**

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**Project No. 2425  
Contract No. OE-5-10-005**

**Richard E. Ripple  
Marvin D. Glock  
Jason Millman**

**July, 1967**

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated, do not, therefore, necessarily represent official Office of Education position or policy.

**Cornell University**

**Ithaca, New York**

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## Acknowledgements

The conduct of any large-scale educational research effort requires the cooperative assistance of many people. In some meaningful sense all of these people are authors of the research report. Although we have assumed the role of co-authors, it is most appropriate at this point to acknowledge the unnamed "contributing authors."

Our first indebtedness is to the approximately 5500 eighth grade students who willingly submitted to several hours of testing and applied themselves conscientiously to the instructional materials provided during the course of the research. The availability of these students, and the scheduling and successful conduct of the research in the classroom, were made possible by the gracious cooperation of administrators and teachers in the following schools:

Amherst Central Junior High School...	Amherst, N.Y.
Binghamton East Junior High School...	Binghamton, N.Y.
Binghamton West Junior High School...	Binghamton, N.Y.
East Aurora High School.....	East Aurora, N.Y.
Endicott J.F. Snapp Junior High School.....	Endicott, N.Y.
Endicott H.B. Endicott Junior High School.....	Endicott, N.Y.
Englewood Lincoln High School.....	Englewood, N.J.
Greene Central School.....	Greene, N.Y.
Hammondsport Central School.....	Hammondsport, N.Y.
Haverling Central School.....	Bath, N.Y.
Lansing Central School.....	Lansing, N.Y.
Maryvale Junior High School.....	Cheetowaga, N.Y.
Newark Valley Central School.....	Newark Valley, N.Y.
Pearl River Central School.....	Pearl River, N.Y.
Ramapo Central School, Kakiat.....	Spring Valley, N.Y.
Ramapo Central School, Spring Valley J.H.S.....	Spring Valley, N.Y.
Sayre Area Joint High School.....	Sayre, Penn.
Seneca Falls Junior High School.....	Seneca Falls, N.Y.
Union Free School District No. 5.....	Port Chester, N.Y.
Waterloo Junior High School.....	Waterloo, N.Y.
Watkins Glen Central School.....	Watkins Glen, N.Y.
Waverly High School.....	Waverly, N.Y.
Whitney Point Central School.....	Whitney Point, N.Y.

A considerable debt is owed to the three research assistants to the research project. Mr. Lawrence Wightman bore the bulk of

the responsibility for programing and analyzing the data gathered, and otherwise contributed in important respects to the research. Mr. John Dacey (now a professor at Boston College) contributed substantially to the development and refinement of the programed materials and the instruments used in the research as well as aiding in the data gathering process. Mr. Robert O'Reilly further aided us in the development and refinement of the instruments and instructional materials, and was particularly helpful in the preparation of the final report. As representatives of the project who most frequently visited the schools, we are indebted to these individuals for their role in arranging the successful conduct of the research in the classroom.

Few, if any, large research projects are completed without the aid of one's colleagues. To our colleagues in the School of Education and in other departments at Cornell University we express our appreciation for three years of counsel in formal and informal meetings of all kinds. The project would have suffered without their continued willingness to discuss our research problems.

Finally, we would like to thank Mrs. Peggy Hash, Mrs. Tamar Rogachefsky, Mrs. Beverly Brown, Mrs. Karen Davis, Mrs. Kathy Melick, and Mrs. Laura Relyea, the secretaries who contributed at various stages to the completion of the research.

R.E.R.  
M.D.G.  
J.M.

Ithaca, New York  
July, 1967

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## SECTION 1

### INTRODUCTION

#### Background and General Research Problem

The investigation reported in this document came into being on July 1, 1964, financed by a grant from the Cooperative Research Branch of the United States Office of Education. The basic idea underlying the investigation was a comparatively simple one: For any practical problem, there is some best group of treatments and some best allocation of persons to these treatments.

In an attempt to apply this generalization to instruction as it goes on in schools, we noted that the introduction of programed instructional materials into American schools has presented students with a new kind of learning task structure. Recognizing that neither programed instruction nor conventional instruction was "all of a kind" it did seem that the structure of the task involved in learning from programed material differs from the conventionally structured learning task in several important respects. In learning from programed materials (more so than in conventionally structured learning tasks):

- a) the learner works by himself at his own rate of speed. There is a relative absence of social, emotional and cognitive exchange between the learner and other students or the teacher.
- b) the learner receives immediate reinforcement for his responses. He knows immediately whether his response is right or wrong.
- c) the subject matter content of the lesson is arranged in a series of very small steps which tend to repeat the essentials of the lesson. Not only is the content repeated for the learner, but the entire manner of presentation and response mode is repetitious in nature.
- d) the learner's freedom of response is restricted. The response which the program permits from the learner is extremely limited and the learner's thinking is forced to severely conform to the structure of the program.

Given these elements as constituting the basic differences between programed instruction and more conventionally structured learning tasks, we set out to test the generalization about persons and treatments in an educational setting. Does the manner in which a learning task is structured have any influence on the learner's achievement? But this formulation of the question is incomplete, and it should be emphasized that this investigation is more than a programed-instruction-versus-conventional-instruction study. We were interested in an optimum relationship between persons and treatments (i.e., between learner type and instructional type). We were en route to formulating our general statement of the problem, but we had not yet arrived!

One of the agreed upon tenets of good educational practice is that of meeting individual differences of learners through instruction. It is this very notion that makes programed instruction attractive to its advocates. However, recent reviews of the research literature on programed instruction indicate little attention to its effectiveness on learners with a wide variety of characteristics (Morrill (48), Silberman (57), Strolurow (60), Schramm (55), 1967 NSSE Yearbook (36)). In summarizing the present state of affairs with regard to meeting individual differences through programed instruction, Gotkin (22) concluded:

. . . there is little evidence that programs thus far written for classroom use really individualize classroom instruction. . . . To argue otherwise is to offer a naive notion of individualized instruction. By enabling students to proceed on their own and at their own pace, programed instruction does break the traditional lockstep of classroom procedure. In breaking the lockstep it makes an enormous stride forward in individualizing instruction. But that is only one dimension of individualization. (p. 11)

What are some of the other dimensions? We were impressed by the arguments of Sears and Hilgard (56) in this regard. Noting the current preoccupation with cognitive processes, these authors write:

In these days of emphasis upon cognitive processes, it is quite possible for the pendulum to swing too far, and hence, to defeat the attainment of the very cognitive goals that are being sought. . . the teacher's awareness of the affective interaction with pupils is as important in a curriculum directed toward cognition as one with other goals, such as those of social competence or personal adjustment. (p. 197)



Hence, we became sensitized to the role that affective characteristics of learners play in the learning process. We noted that research relating personality characteristics of learners to effectiveness in learning from programmed materials was singularly missing in the literature. Indeed, some writers cited a need for such studies. Coulson (13) stated:

The view is taken that programmed instruction must be considered in perspective among other educational techniques, each having its own advantages and disadvantages for specific requirements. Research should be directed toward the discovery of ways in which techniques of programmed instruction may be combined with other educational methods to optimize instruction for different tasks and for different student characteristics. (p. 372)

Strong (61) further anticipated an approximation of our research in indicating needs for research in programmed instruction:

Greater effort should be expended in relating intellectual, emotional, and motivational variables to various sensory modes, and personality variables such as anxiety, need achievement, and extraversion-intraversion. (p. 226)

At this point we were ready to state our concern for an optimum relationship between learner type and instructional type in the form of the following general program to which we directed our research effort. What relationship, if any, exists between selected personality characteristics of students and the relative degrees of success they have in learning from programmed instructional materials and from conventionally structured learning tasks?

#### Rationale for Selection of Learner Characteristics and Specific Research Objectives

A thorough review of the literature led us to select four personality characteristics of learners which might be differentially related to success in learning from programmed materials and from more conventionally structured learning tasks: anxiety, exhibitionism, compulsivity, and creativity.

Our interest in anxiety stemmed from its well recognized effect of interfering with learning in the classroom. Anxiety is defined as a stable response tendency, composed of physiological

reactions, and is realized by the individual as a generalized state of unpleasantness. The anxious child is characterized as excessively dependent upon external support in the learning situation and is easily disconcerted by evaluative and other adverse comments made by his teachers.

Several studies (McCandless and Castaneda (45), Feldhusen and Klausmeier (18)) have demonstrated that anxiety in students is negatively related to school achievement. Other investigations (Flanders (19), McKeachie, Speisman, and Pollie (46), Sarason et al. (54)) support the view that the anxious subject is easily disconcerted by evaluative and other adverse comments made by the classroom teacher. Experimental studies of the effects of verbal comments implying blame or personal evaluation on the task performance of anxious subjects further supports this view (Sarason (53), Costello (12)). Grimes and Allinsmith (24) suggest that the achievement of anxious students is, in part, a function of the degree of structure in the learning task. Structure was defined in general terms, including such elements as gradual and sequential presentation of information, lack of discontinuities in the task, and clarity of task procedures and requirements. Achievement scores of high and low anxious children were compared in schools differing in the amount of structure in the teaching of reading. High anxious children achieved significantly more in the structured schools than high anxious children in the unstructured schools. Representative evidence of this sort turned our attention to the relevance of anxiety for the present investigation.

Note that in the conventionally structured learning task situations are often ambiguous with regard to what is specifically expected of the learner. The student is often under social pressure to make appropriate responses; others are aware of whether his response is correct or incorrect. In the programmed learning task the material is structured so that the required responses are clearly apparent to the learner. Social pressure to make correct responses is not inherent in the task; no one but himself need know if he has made an error.

We reasoned that the structure of the task involved in learning from programmed material would be less likely to arouse the debilitating anxiety responses in students than would the more conventionally structured learning task. Consequently, we expected that learners scoring high on tests of anxiety would do relatively better in the programmed learning task situation.

We conceived of exhibitionism as the degree of an individual's positive attitude toward showing himself and his products to an audience -- a tendency to approach situations involving public performance. This conceptualization of exhibitionism was based on the research of Levin and Baldwin (38) and Levin, Baldwin, Gallwey and Paivo (39). Note that in the conventional class

situation the student is urged to participate and may even be called upon by the teacher to recite. In responding, he makes public his knowledge or the lack of it. On the other hand, in the programmed learning task the student makes his responses in private. There is no opportunity to "exhibit his products" to an audience.

The line of reasoning is clear. The structure of the task involved in learning from programmed material does not permit an individual to exhibit his products to an audience as much as does the more conventionally structured learning task. Hence, we expected that learners scoring low on tests of exhibitionism would be relatively better in the programmed learning situation.

Compulsivity has been defined as the tendency to perform some action, even when it is known to be unnecessary and absurd. The compulsive individual is described as one who demands that situations have a high degree of order and repetitiveness. Grimes and Allinsmith (24) present an excellent review of definitions of compulsivity. In their research they found similar results for compulsivity (regarding student achievement in structured and unstructured learning situations) as for anxiety.

Note that the programmed learning task is characterized by its repetitious nature. This repetition is twofold: first, the essential material to be learned is repeated in a number of situations; second the entire task is repetitious in that the learner is called upon to perform basically the same type of behavior throughout the time he works on the task. In addition, the small steps of which the program is comprised is indicative of a high degree of organization of the material to be learned. The high degree of repetition and organization in the conventionally structured learning task is not as pronounced.

Again, our line of reasoning is clear. The structure of the task involved in learning from programmed instruction is characterized by greater repetition and order than is the conventionally structured learning task. We expected that learners scoring high on tests of compulsiveness would do relatively better in the programmed learning task situation.

Finally, we took Guilford's distinction between convergent and divergent thinking as a point of departure in identifying the relevance of creativity. Convergent thinking leads to the "right answer" which can be determined from the information given. Divergent thinking is defined as the kind which goes off in different directions. It makes possible changes of direction in problem solving and leads to a diversity of answers where more than one answer is appropriate.

Several investigations suggest that the creative individual has generalized needs and preferences which may be incompatible with the restrictiveness and thought control of programmed materials.



Barron (3) concluded, on the basis of his research, that creative persons prefer complexity and imbalance in phenomena. He reasoned further that creative persons are disinclined to discipline their thoughts and actions and that through past experience they have come to seek the more disorganized and complex problems in life. Similarly, MacKinnon (41), in a study of creative architects, concluded that creative persons prefer asymmetry and complexity, are impulsive, and highly motivated in independent activities. Getzels and Jackson (21) characterize the creative individual as one who makes unusual responses in learning situations and who diverges from the customary in his preferences and behavior. Further evidence concerning the relationship of creativity to achievement from programmed instruction is offered by Gotkin and Massa (23). The correlation between verbal creativity scores and achievement gains of fourth and fifth grade students who worked for two months on a vocabulary program was of about a -.30 order. Such evidence suggests that the creative thinking abilities of students might contribute negatively to their achievement from programmed instructional materials.

Note that in learning from programmed material the learner's freedom of response is restricted. That is, the response which the program will allow from the learner is extremely limited, and the learner's thinking is forced to conform severely to the structure of the program. The degree of restriction of thinking in the conventionally structured learning task is not as pronounced. Hence, we reasoned that the structure of the task involved in learning from programmed materials would inhibit (and therefore interfere with the learning of) the individual who is characterized in his thinking style by divergent rather than convergent thinking. We expected that learners scoring high on tests of convergent as compared to divergent thinking would do relatively better in the programmed learning task situation.

It should be quickly pointed out that these personality characteristics were not intended to exhaust those aspects of personality which might be differentially related to success in learning from programmed materials as compared to learning from conventionally structured learning tasks. Nor were they conceived as of being unidimensional. They were merely our starting points. We suffered the same constraints of finances, time, and energy that beset all researchers. Although in some larger sense these starting points are modest, we felt that more comprehensive intentions would be overly ambitious in view of the constraints under which we worked. In this sense our efforts should be viewed as a feasibility study rather than as a conclusive one.

Again, the personality characteristics we have identified as being germane to our general research problem are not intended to be exhaustive, nor are they conceived of at this point as

unidimensional. Subsequent sections of this report will deal with our procedures for identifying more specific variables within the range definitions of anxiety, compulsivity, exhibitionism, and creativity.

Our expectancies are of the form suggesting an interaction between an instructional type (programed, conventional) and a particular personality characteristic of a learner. While the general objective of our research was to ascertain the relationship of selected personality characteristics of learners and differential success in learning from programed materials and from a more conventionally structured learning task, the more specific research questions may be stated as follows:

1. To what extent is there an interaction between compulsiveness and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It is expected that learners scoring high on compulsiveness will do relatively better in the programed learning task situation.)
2. To what extent is there an interaction between the convergent-divergent thinking characteristic of a learner and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It is expected that learners scoring high on convergent thinking compared to divergent thinking will do relatively better in the programed learning task situation.)
3. To what extent is there an interaction between exhibitionism and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It is expected that learners scoring low on exhibitionism will do relatively better in the programed learning task situation.)
4. To what extent is there an interaction between anxiety and type of learning structure (programed, conventional) and is this interaction statistically significant? (It is expected that learners scoring high on anxiety will do relatively better in the programed learning task situation.)

In addition to these specific questions, our design and analysis made it possible to secure evidence regarding such secondary questions as:

5. To what extent is there an interaction between intelligence and type of learning task structure (programed, conventional) and is this interaction statistically significant?

6. To what extent is there an interaction between sex and type of learning task structure (programed, conventional) and is this interaction statistically significant?
7. To what extent is there a difference between learners who are high and those who are low on selected personality aspects in their performance on the criterion measures and are these differences statistically significant?

### Procedures

The investigation was carried out over a two year period, 1964-1965 and 1965-1966. Approximately 5,000 eighth grade students from junior high schools in New York, New Jersey, and Pennsylvania participated in 1964-1965, the pilot year. This year was spent in refining our data gathering instruments, instructional materials, and other research procedures. The experimental year, 1965-1966, involved the participation of approximately 1,200 eighth-grade students from 22 junior high schools in the same three states. The details of procedures during the pilot year are described in the body of the report and in the Appendixes. The descriptions that follow (regarding subjects, data gathered, analysis, and instructional treatments) are provided here merely as an overview and refer only to procedures during the experimental year, 1965-1966. They, too, will be elaborated on in the body of the report.

### Subjects

In each of 22 junior high schools, two eighth-grade English classes roughly equivalent in intelligence and sex distribution were identified. One class was randomly assigned to a programed instructional condition, the other to a conventional instruction condition. Similar instruction in vocabulary development by means of affix and root analysis and use of context were presented by the two instructional conditions in ten regularly scheduled periods. Each instructional treatment consisted of approximately 600 subjects.



## Data Gathered

Intelligence test data were obtained on all subjects from the Lorge-Thorndike Intelligence Test. In addition measures of the personality variables were constructed and administered to all subjects. The dependent variables consisted of four scores from specially constructed vocabulary criterion tests. These tests yielded scores on recall, transfer, generation of hypotheses, and total score. Supplementary data on students, teachers, and schools (to be described in detail later) were also gathered.

## Analysis

For each analysis, subjects in each school were placed into one of 16 subgroups based on dichotomization of the independent variables: sex, intelligence (high, low), level of the personality variable under consideration (high, low), and treatment condition (programed, conventional). The dependent variable for purposes of analysis was the mean score (of all students on a given school in a particular subgroup) on each of the four vocabulary criterion tests. Schools served as the "replicate" in the analysis. Four-way factorial analyses of variance were carried out for all personality variable and criterion test combinations. The main effects of sex, intelligence, treatment condition, and each of the several personality variables together with all interactions were obtained and tested for significance. The tests of significance for the interaction of each personality variable and treatment condition on each of the four dependent variables constituted the appropriate hypothesis tests addressing the major research questions raised by this study.

## Instructional Treatments

The development and description of the instructional materials used in the two treatment conditions are given a capsule treatment below. They will be described in more detail in the body of the report.

The original programed instructional materials were devised by Glock and Schepman. The content of the program can be described as vocabulary development by means of affix and root

analysis and use of context. More specifically the program taught word elements, affixes, and combining forms which have fixed and invariant values.

The original materials went through the following development. First, the program was tried out with three average students and three above average students individually at the eighth grade level. Based on the responses of these students, analysis of the program by the research staff, and analysis by a special consultant, modifications were made. These modifications were intended to increase the interest of the materials for eighth-grade students, manipulate the error rate of some frames, and redesign the form of the program (including the design and manufacture of a program holder). In January and March of 1965 the program was administered to students in ten schools with two or more classes in each school. Approximately 3,000 students were involved in these trials. After each trial, modifications in the program were made. Error rates per item and per lesson were obtained. In no case did the error rate per item exceed 15 per cent. The average error rate per lesson was approximately 5 per cent.

The final version of the Improving Reading Vocabulary Program (IRV) was in the form of ten lessons -- each lesson in booklet form printed on 5 x 8 paper. The program was in a linear format of the constructed response type. Although the program was aimed only at improving reading vocabulary, a pronunciation guide was incorporated in the form of a phonetic, hyphenated version of every new word placed in parenthesis immediately after its first appearance in the program.

The same content covered by the programmed materials was presented to students in the conventional instruction treatment condition by the classroom teacher. For each programmed lesson a corresponding lesson plan was constructed. These lesson plans were compiled in an 94 page Lesson Guide for Improving Reading Vocabulary. The lesson plans in the guide, together with whatever changes the individual teacher made to them, defined the conventional teaching situation. Each teacher was invited to make whatever changes in the plans that she felt were called for by the individual teaching situation. However, in order to preserve similar elements of order and content across the two treatment conditions, teachers were asked to cover specific content of any given lesson on the particular day that lesson was scheduled. Thus the two instructional conditions differed mainly in the approach to the way the student was taught.

The individuals who designed or contributed to the construction of the Lesson Guide all had a number of years of teaching experience in the public schools. Student-teacher verbal interaction was emphasized in each lesson. The organization of each lesson had three main parts: objectives, content body of the lesson, and suggested techniques through which the material of the lesson could be presented. A variety of instructional approaches or techniques were incorporated into the lessons (e.g., tape recordings, mimeographed materials, use of slides and other audio-visual aids, lectures, use of the blackboard, review exercises, quizzes, etc.). All supplementary instructional materials were provided to the teacher.

### Summary and Plan of the Report

This section has attempted to provide the background for the general research problem, a rationale for selection of the learner characteristics, the specific research objectives, and an overview of the procedures used during the experimental year. Section 2, Method, describes the research procedures in detail -- including the pilot and experimental years. Section 3, Results, presents the research data obtained. Section 4, Discussion, includes an analysis and interpretation of these results together with some conclusions and implications. Section 5 will summarize the report. A full bibliography of references and a series of Appendixes containing further details on procedure, instrumentation, and data are attached.

## SECTION 2

### METHOD

The research was pursued over a period of two successive yearly phases designated the pilot phase and the experimental phase. The pilot phase was devoted primarily to the development of the data gathering instruments and instructional materials used during the experimental year of the research. Descriptions of the various subsamples, as well as the separate research efforts of the pilot year of the research, are presented in greater detail in Appendixes A, B, C, D, E, F, and G. This section of the report presents a description of the methodological details necessary to explain the nature of the experimental phase of the investigation. Reference is made to the appendixes at appropriate points in this section for the reader interested in further details concerning the methodology of the investigation.

#### 2.1: Selection of Subjects

The study was carried out in 22 junior high schools. Twenty of these schools were in New York State, one was in New Jersey, and one was in Pennsylvania. Each of these 22 schools had participated in one or more aspects of the pilot research during the previous school year. Roughly half the schools served rural areas; the remainder were either suburban or small city school systems. Table 29 in Appendix A is a listing of the participating schools identified by location and enrollment during the investigation.

In each of the 22 schools, a pair of English classes, roughly matched on the distribution of mental age scores (Lorge-Thorndike IQ, Level IV, Verbal Form A) and sex, were identified and randomly assigned to a programed condition or a conventional condition. Classes were generally average to slightly above average in mental ability. The mean of the mental age scores for the programed group was 57.83, with a standard deviation of 9.87. The respective values for the conventional group were 58.01 and 10.11. The total sample consisted of 1040 eighth graders (542 girls and 497 boys) in 44 classrooms. The 22 classes assigned to the conventional condition with their regular teacher had 527 subjects, the programed condition had 513. Tables 27 and 28 in Appendix A present, respectively,



the distribution of the sexes and the mental age means by class within the instructional conditions.<sup>1</sup>

## 2.2: Schedule of Administration of the Learner Characteristics Measures and the Instructional Materials

Table 1 shows the order, testing time, and type of administrator for the tests and instructional materials used in the research. The Lorge-Thorndike IQ test was administered during the latter part of September, 1965. Scores from this test were then used for selection of classes (when more than two were available in any given school), followed by random assignment to treatments.

Table 1

Schedule and Order of Administration of  
the Learner Characteristics Measures, the Criterion Test  
and the Instructional Treatments  
for the Programed and Conventional Classes

<u>Name of Test</u>	<u>Time (Minutes)</u>	<u>Administered by</u>
Lorge-Thorndike Intelligence (Level IV, Verbal Form A)	35	Local Guidance Staff
Creativity and Exhibitionism <sup>a</sup>	28 + 12	Research Staff
Anxiety and Compulsivity <sup>a</sup>	20 + 20	Research Staff
10 consecutive periods of programed or conventional instruction <sup>a</sup>	40 - 50 (per day)	Classroom Teachers
Criterion Test <sup>a</sup>	35	Local Guidance Staff

<sup>a</sup>Instruments constructed for use in the research.

<sup>1</sup>Totals for sex and condition are discrepant due to the fact that one subject was not classified on the sex variable.

During the month of October, the four learner characteristics measures developed for use in the research were group-administered to the programmed and conventional classes during a single school day. Standard instructions designed to elicit the cooperation of the students were used in administering the anxiety, compulsivity, and exhibitionism measures. By comparison, the creativity battery involved the usual elements of the academic test situation -- instructions emphasizing timing and speed of response. For the creativity battery, students responded directly on the test booklet. Students responded on IBM "mark-sense" cards for the tests of anxiety, compulsivity, and exhibitionism, and an additional measure of convergent thinking (described below).

Following the initial testing, the programmed and conventional classes in the 22 schools received 10 periods of instruction during their regularly scheduled English periods. In all classes, lesson one was begun on the last day of a given school week, followed by nine consecutive daily periods of instruction. The criterion test was administered the day after the final lesson. Length of class period varied from 40 to 50 minutes across schools. Within any given school the instructional schedule for the programmed and conventional lessons was the same. The ten periods of instruction and the criterion test were completed in the total school sample during the interval beginning with the first week in November and extending through the first two weeks in December.

### 2.3: Measures of the Independent Variables

The four learner characteristics measures (compulsivity, exhibitionism, anxiety, and creativity) were developed and refined for use with eighth graders during the pilot year of the research. The procedures and results of these efforts are presented respectively in Appendixes B, C, D, and E. Before proceeding to the description of each of these measures and the methodological details of their use during the experimental year of the research, it is appropriate to survey briefly the strategy leading to their development.

The general objective of instrument development was to arrive at several homogeneous and relatively specific subjects or item groupings, each of which purported to measure a specific manifestation of the more generally conceived personality construct. A thorough review of the literature for each of the



four learner characteristics led to a definition on which there appeared to be general agreement. This definition was then subdivided into smaller categories, each representing a narrower behavioral tendency or other such meaningful division of the construct. For example, the general label for one of the instruments was school anxiety, and this eventually subsumed more specific types of anxiety such as test anxiety, peer anxiety, teacher anxiety, and so on.

Following this definitional stage, items representative of the various subdivisions associated with the general constructs of compulsivity, exhibitionism, and anxiety were written and/or selected and revised to conform to one or more test formats. For the creativity battery, the procedure involved both writing and selecting items for the measurement of dispositional characteristics of the creative individual, and the development of verbal and pictorial stimulus situations designed to elicit creative responses. The initial four test batteries were each approximately four times as long as the final instrument used during the experimental year of the research, and required two 40-minute class periods for completion.

The next two stages of test development involved analysis, refinement, and reduction of each test battery, resulting in a final instrument which could be group administered in 20 minutes. In the first of these stages, each instrument was group administered to a separate sample of 250 to 350 eighth graders selected from the pilot sample of roughly 3000 subjects. The item subdivisions for each instrument (in the case of creativity, specific subtests of verbal creativity and item subdivisions) were submitted to separate principal components analysis with a varimax rotation. Items in each subdivision (or subtest) were then eliminated on the basis of: (a) low loadings on the principal component; and (b) low variance.

Except in the case of exhibitionism, the last stage of test refinement resulted in a final 20-minute measure of each characteristic consisting of subscores or subtests related to the general definition of the construct. The efforts for exhibitionism culminated in one final general measure of the characteristic. The four test batteries were group administered in pairs during two 40-minute class periods. Separate samples of 250 to 300 eighth graders were used for each administration. The raw data for each instrument were scored and again submitted to a principal components analysis with varimax rotation. The procedures for analysis differed from the previous stage in that item subdivisions associated with a given learner

characteristic were combined for the factor analyses (as many items or subtests as the computer program could handle). The results obtained in the varimax rotations at this stage of the analysis were of primary importance in establishing the statistical homogeneity of the hypothesized item groupings or subtests.

In the paragraphs which follow, descriptions of the instruments developed for use in the experimental year of the research are presented. The description for each instrument includes a brief definition of the psychological meaning of the construct purported to be measured, the procedures used in testing and scoring, descriptive statistics, and reliability estimates of the various scores. The data and procedures presented are based on the administration of the instruments during the experimental year of the research.

### The Compulsivity Scale

The compulsivity scale, administered under the title, Cornell Multiple Preferences, contained 62 self-report items of the three types shown below:

Would you rather...?

Type 1 ...use a brand new book?  
...use a book with some answers written in it?

Type 2 neat.....casual (choose one)

Type 3 I hate to be interrupted in the middle of an assignment ("yes-no").

Responses to the compulsivity scale were scored for two general types of compulsivity: (a) constructive which was derived from items scored for the subtests meticulousness, tendency to finish, cautiousness, and intolerance of incompleteness; and (b) unconstructive which was derived from items scored for the subtests intolerance of indefiniteness, uncomfortableness in social relations, and paralyzed initiative. Items in each subtest were scored zero or one, and the total scores for the two general factors of compulsivity were a simple additive function of the appropriate subtest scores. The method of scoring for the two general factors of compulsivity (combining subtests scores) was substantiated in a second order factor analysis of item responses derived from the administration of

the compulsivity scale to the experimental sample (see Appendix B).

The subtests which contribute to the constructive compulsivity score purport to measure types of coping responses which conceivably work to the advantage of the individual in academic achievement and related situations. Those contributing to the unconstructive compulsivity scores are, in contrast, maladaptive in that they may be expected to contribute negatively to the individual's success in the same situations. However, both the general factors represented by constructive and unconstructive compulsivity may be conceived of as reactions or responses to intolerance of ambiguity, and as such have limited adaptability (Grimes and Allinsmith, (24)).

The specific content of the compulsivity scale and data bearing on its development and validity are presented in Appendix B. Descriptive data, Kuder-Richardson Formula 20 reliability indexes, and mean item discriminations for the various compulsivity scores based on administration to the total sample in the experimental year are presented in Table 2. Means and standard deviations of the compulsivity scores for the separate programed and conventional groups are presented in Table 3.

The descriptive data for the compulsivity scores presented in Table 2 are summarized as follows. The subtest scores for constructive compulsivity tended to be more internally consistent or homogeneous than those comprising the unconstructive compulsivity score. However, with the exception of the intolerance of indefiniteness subtest, the internal reliabilities of the subtest scores for both constructive and unconstructive compulsivity are respectable when subtest length is considered. The average discrimination power of the subtest items tends to be low-moderate. The somewhat lower mean discrimination power of total constructive and unconstructive compulsivity scores reflects, in part, the greater heterogeneity of these composite scores. The lower internal reliability of the unconstructive compulsivity score, as compared to constructive compulsivity, probably reflects somewhat greater heterogeneity and attenuation due to the fewer number of items comprising the former. The data shown in Table 3 indicate that the compulsivity subtest means for the two treatment groups differed by roughly one to two percentage points.

Table 2  
Descriptive Data and Internal Reliabilities for the  
Compulsivity Subtest Scores Based on the  
Combined Programed and Conventional Treatment Subjects<sup>1</sup>  
(N = 1003)

<u>Subtests Scored for Constructive Compulsivity</u>	<u>Number Items</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>K-R 20 Reli- ability</u>	<u>Mean Discrim- ination<sup>a</sup></u>
1. Meticulousness	16	10.82	2.90	.68	29.1
2. Tendency to Finish	8	5.11	1.86	.58	37.6
3. Cautiousness	8	4.89	1.78	.56	35.1
4. Intolerance of Incompleteness	6	4.53	1.21	.32	31.7
Constructive Compulsivity (Total of subtests 1, 2, 3, 4)	38	25.35	5.93	.81	25.1
<u>Subtests Scored for Unconstructive Compulsivity</u>					
5. Intolerance of Indefiniteness	6	3.20	1.17	-.07	30.0
6. Uncomfortableness in Social Relationships	8	3.37	1.64	.39	32.8
7. Paralyzed Initiative	10	5.20	2.23	.58	36.5
Unconstructive Compulsivity (Total of subtests 5, 6, and 7)	24	11.77	3.52	.57	23.5

<sup>1</sup>All data are based on raw scores.

<sup>a</sup>Average of the discrimination indexes for items in a sub-  
test based on the difference between the upper and lower halves,  
on the total score for the given subtest (or subtest composite).



Table 3

Means and Standard Deviations of the Compulsivity Scores  
for the Programed and Conventional Treatment Groups<sup>1</sup>

<u>Constructive Compulsivity</u> <sup>c</sup>	<u>Programed</u> <sup>a</sup>		<u>Conventional</u> <sup>b</sup>	
	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
1. Meticulousness	68.35	19.08	68.83	17.36
2. Tendency to Finish	66.28	23.21	64.02	23.30
3. Cautiousness	68.59	22.05	71.12	20.63
4. Intolerance of Incompleteness	75.21	20.94	76.66	19.46
<u>Unconstructive Compulsivity</u>				
5. Intolerance of Indefiniteness	53.80	19.16	53.07	19.68
6. Uncomfortableness in Social Relationships	43.04	22.52	43.04	21.65
7. Paralyzed Initiative	52.44	21.01	54.71	21.72

<sup>1</sup>All scores converted to percents.

<sup>a</sup>N = 495.

<sup>b</sup>N = 506.

<sup>c</sup>Percentages were total number of appropriate responses divided by the total number of responses made by a given student. This procedure ignores items to which the student did not respond. Raw score procedure made no allowances for "no response" to an item scored for a subtest or total score.

#### The Exhibitionism Scale

The exhibitionism scale was administered under the title, Student Attitude Survey, and contained 45 self-report items of the same three types listed previously for the compulsivity scale. Items were scored zero or one, with the total score for exhibitionism being the sum of appropriate responses to the 45 items.

The delineation of behaviors, preferences, and tendencies represented in the exhibitionism scale is generally similar to well known descriptions of the adult exhibitionist (Edwards (16)) or extrovert (Knapp, (35)). A major difference is that the present scale is in part oriented toward the measurement of exhibitionist tendencies and preferences as expressed in the school situation. Items indicative of exhibitionism in the present scale refer to tendencies or preferences for interacting in social situations, speaking in front of the class, being brisk and energetic, wanting to show off, and participating in group activities in the school situation as opposed to the more sedentary and singular preferences for working alone in school, reading books, being shy, and staying in the background.

High scores on the exhibitionism scale are presumably indicative of a dominant and generalized motive in which the individual's goal is essentially that of approbation (cf. Levin, Baldwin, Gallwey, and Paivo (39)). Goal responses may be seen in various forms of behavior such as general socializing, being a frequent speaker in class, being the first to do something "new", and so on.

The specific content of the exhibitionism scale, and data bearing on its development and validity, are presented in Appendix C. Raw scores from the administration of the scale had a mean of 24.81 and a standard deviation of 7.55, based on the combined programmed and conventional subjects (N = 1136). Exhibitionism scores, converted to percents, had a mean of 56.90 and a standard deviation of 16.24 for the programmed subjects. The respective values for the conventional subjects were 56.31 and 16.57 per cent. An item analysis for the total sample (see Table 42 in Appendix C) indicated that all items discriminated in the appropriate direction, with most of the items discriminating at a low-moderate level. Internal reliability of the exhibitionism scores, using the Kuder-Richardson Formula 20, was .85.

#### Measures of Verbal Creativity and Convergent Thinking

This battery consisted of four measures of verbal creative thinking ability and a brief measure of convergent thinking ability. Subjects were presented the five tests in a mimeographed booklet. The content of the battery and the procedures used in its development are presented in Appendix D.

Three of the four verbal creativity subtests included in the battery were scored for the well known divergent thinking factors, flexibility, originality, and fluency, and were adapted from the Minnesota Tests of Creative Thinking, Verbal Form A (Torrance (64)). The procedure for using these subtests differed from Torrance's primarily in that each of the subtests was scored for a single verbal creativity factor, rather than scoring each subtest for all three. This modified scoring procedure was substantiated in a factor analysis of the creativity subtests during the pilot year of the investigation. The factor analysis indicated that the scores for flexibility, originality, and fluency were not statistically independent when each was derived from the protocols of all three subtests.

A brief survey of the testing and scoring procedures for these three verbal creativity factors follows. A more detailed summary of the scoring procedures, with examples, is given in Appendix D. Each of the tests presents the subject with a pictorial stimulus of an elf gazing into a pool. In the "Asking Questions Test," subjects were instructed to respond with as many relevant questions about the picture as they could in five minutes. Responses were scored for flexibility, with one point given for relevant questions in any of 21 categories (one reference allowed per category). In the "Guessing Causes Test," subjects were asked to list as many causes of the elf's behavior as they could in five minutes. Responses were scored for originality, with each response given from zero to two points depending upon its predetermined statistical rarity. In the "Guessing Consequences Test," subjects suggested as many relevant results of the action in the picture as they could in five minutes. Responses were scored for fluency, with one point given for each relevant consequence listed.

For the fourth verbal creativity test, titled the Imaginative Story Test, subjects wrote as imaginative and divergent a story as they could in eight minutes. Stories were scored for imagination, receiving from zero to two points on each of 11 categories typically found in creative stories. The criteria used in scoring the imagination test were originally derived from 22 criteria developed by Torrance, Peterson, and Davis (67). The 11 categories used were those with the best loadings on the first general factor in an analysis of responses on the imagination subtest, accomplished during the pilot year of the investigation.

The measure of convergent thinking used was the Object Uses Test developed by Guilford (25), (26). The original

test consists of ten items. Each item presents the student with a task and five objects -- one of which is appropriate for successfully accomplishing the task. A sample item is:

To start a fire --

- a. fountain pen
- b. onion
- c. pocket watch
- d. comb
- e. bowling ball

To solve the problem, the student should select c, the pocket watch, since it contains a magnifying crystal and could be used in starting a fire.

An item analysis of the Object Uses Test during the pilot stage of the research showed that six of the ten items in the original test differentiated well between high and low scorers. These six items were used as the test of convergent thinking in the experimental year of the investigation. Internal reliability (Kuder-Richardson, Formula 20) for the six item test was .57. Time allotted for completion of the test was three minutes.

The roughly 1200 protocols for the four verbal creativity subtests were scored by five Cornell University English majors who were given special training for the task. At an advanced stage in the scoring, 43 protocols were randomly selected from the total, and were scored independently by each of the five scorers. Interscorer reliabilities ranged from .74 to .90 for imagination, from .86 to .96 for flexibility, from .75 to .87 for originality, from .89 to .96 for fluency, and from .89 to .93 for the combined subtest scores.

Scores for the combined programed and conventional subjects on the four verbal creativity subtests, and the Object Uses Test were standardized to a mean of 100, and a standard deviation of 20. The four verbal creativity subtest scores for each subject were then combined additively into a total creativity score.

An additional score, termed the total creativity minus convergent thinking score, was calculated for each subject by subtracting his standardized score on the Object Uses Test from his standardized total creativity score. This score is, in a loose sense, an estimate of the student's convergent thinking ability relative to his verbal creative thinking ability.



A low score is presumably indicative of a rough balance between convergent thinking and verbal creative ability. A high positive score is indicative of a preponderance of verbal creative thinking ability relative to convergent thinking ability. A negative score indicates that the student's convergent thinking ability is greater relative to his divergent thinking ability. The usefulness and meaning of this score, however, is limited by the fact that only a single three minute test was used to measure convergent thinking ability.

Estimates of the reliability of the verbal creativity scores were obtained from a test-retest administration of the complete battery to 219 subjects selected from the total sample. The retest administration of the battery was given after a five-month interval in connection with another study reported by Ripple and Dacey (49). Using tests and procedures identical to those reported here, the creativity battery was also administered twice, with a two-week interval between tests, to a sample of sixth graders (50). The stability coefficients for these sixth and eighth grade samples are reported in Table 4. The coefficients for the sixth grade sample indicate acceptable reliability for the creativity test scores over short periods of time. However, the coefficients for the longer time period, with the eighth grade sample, are indicative of considerably less stability. This was especially true for imagination and originality where the coefficients suggest little relationship between scores for the first administration and scores obtained five months later.

Table 4  
Test-retest Stability Coefficients  
for Five Verbal Creativity Scores

Test	Stability Coefficients	
	Two-week <sup>a</sup>	Five Months <sup>b</sup>
1. Imagination	.52	.06
2. Flexibility	.73	.38
3. Originality	.51	.14
4. Fluency	.62	.45
5. Total Creativity	.73	.38

<sup>a</sup>Sixth grade sample; N = 72 (Ripple and O'Reilly (50)).

<sup>b</sup>Eighth grade subjects (N = 219) selected from the sample for participation in an additional study; retested using the same battery and procedures five months later (Dacey and Ripple (14)).

## The Anxiety Scale

The anxiety scale was designed to measure anxiety viewed as a discriminable emotional response to stress experienced in the school situation. Stress was conceived as an external stimulus (or stimuli) which the subject interprets as a threat to fulfillment of an internal contemporaneous motive state. The anxiety response was viewed as being primarily physiological in nature. The subject is aware of the stimuli which elicited the response and labels it in certain generally recognized terms (fear, worry) (Mandler, Mandler, and Uviller (42)). Individuals, however, are held to differ in the pattern and intensity of the physiological components of the anxious response and in the kinds and number of situations which may elicit it (B. Martin (43), I. Martin (44), Lazarus (37)).

This definition is similar in its major elements to other well-recognized definitions of the anxiety response (Sarason et al. (54), Lazarus (37)). However, the role of unconscious factors in the historical development of anxiety, and its logical differentiation from fear (included in Sarason's definition) are not emphasized here.<sup>1</sup> A major limitation of the present definition is that it does not include defensive or coping responses recognized in broader definitions of anxiety (Lazarus (37), Rosenwald (51)).

Following from the definition, the anxiety measure consisted of seven relatively specific subtests. All but one of the subtests was designed to measure anxiety as a function of a relatively narrow class of stimuli existing in or associated with the school. The test consisted of 60 self-report items of two general types: (a) "transparent" items which contained a referent for anxiety (e.g., worry, fear) and a specific situational stimulus (e.g., teacher, test); and (b) "objective" items which attempted to measure anxiety indirectly (e.g., "I would be very concerned if I were late for class."). A brief description of the content and nature of the subtests is given below.

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<sup>1</sup>Definitions such as that given by Sarason et al. (54) suggest that this differentiation can be made by somehow assessing the level of irrationality involved in the subject's interpretation of and reaction to the threatening stimulus. Anxiety is viewed as a response disproportionate to the threat value of the stimulus; fear on the other hand is a proportionate or rational response. Such differentiation, however, requires additional techniques of measurement more subtle than the questionnaire used by Sarason et al..

General Emotionality: this subtest consists of five items indicative of the subject's tendency to react abruptly with emotion to relatively minor events. It is the only subtest which is not situationally specific.

Generalized School Anxiety: this subtest consists of six items indicative of the subject's tendency to experience anxiety about school events in situations removed from school (e.g., at home; on the way to school).

General Classroom Anxiety: the 14 items in this subtest are indicative of anxiety with respect to being in class, doing well in courses, and doing well in specific school subjects.

Peer Anxiety: the seven items composing this subtest are indirectly indicative of anxiety experienced in peer relationships.

Parental Pressure for Achievement: this subtest consisted of seven items which purport to measure anxiety about academic performance in school experienced as a function of the pupil-parent relationship.

Teacher Anxiety: the 12 items included in this subtest refer to anxiety experienced as a function of both the personal and academic elements involved in the teacher-pupil relationship. Items for this subtest are phrased both indirectly and directly. Both this subtest and the general classroom anxiety subtest appear to be the most general or heterogeneous of the seven anxiety subtests.

Test Anxiety: the 11 items included in this subtest refer to anxiety or worry before, during, and after taking school tests. Two of the items refer to anxiety over being tested, but experienced in situations removed from school. These items were scored for both test anxiety and the generalized school anxiety factor referred to above.

The items included in the anxiety test were administered in a mimeographed booklet entitled Student Opinion Survey. The subject was requested to respond by indicating whether each statement was "true" or "false" with respect to himself. Items in each subtest were scored zero or one. The number of items scored one in each subtest was added to yield a composite or total anxiety score.

Item content of the anxiety test and data bearing on its development and validity are given in Appendix E. Table 5 presents



descriptive data, Kuder-Richardson Formula 20 reliability indexes, and mean item discriminations, for the anxiety scores based on the administration of the test to the total sample in the experimental year. Means and standard deviations of the anxiety scores for the separate programed and conventional groups are shown in Table 6. The internal reliabilities shown in Table 5 indicate at least a moderate level of internal consistency for the anxiety scores. The average of the item discriminations for the anxiety scores tend to be low-moderate to moderate, with the most heterogeneous item groups having the lowest average discrimination power (i.e., general classroom anxiety, teacher anxiety, and total anxiety). The data presented in Table 6 show that the treatment groups were generally comparable in mean level of reported anxiety for the seven subtests. For the total anxiety score, the programed group had a mean score of 40.90 per cent with a standard deviation of 15.16. The comparable values for the conventional subjects were 42.02 and 15.11 per cent.

Table 5  
Descriptive Data and Internal Reliabilities  
for the Anxiety Scores Based on the Combined Programed  
and Conventional Treatment Subjects<sup>1</sup>

<u>Anxiety Tests</u>	<u>Number Items</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>K-R 20 Reli- ability</u>	<u>Mean Discrim- ination<sup>a</sup></u>
1. General Emotionality	5	1.89	1.50	.64	49.6
2. Generalized School Anxiety	6	1.97	1.58	.58	42.5
3. General Classroom Anxiety	14	5.53	3.03	.73	35.6
4. Peer Anxiety	7	1.93	1.65	.62	37.7
5. Parental Pressure for Achievement	7	3.44	1.70	.53	40.6
6. Teacher Anxiety	12	5.42	2.11	.48	28.8
7. Test Anxiety	11	5.23	2.90	.78	44.8
8. Total Anxiety <sup>b</sup>	62	24.37	9.07	.86	33.1

<sup>1</sup>All data based on raw scores.

<sup>a</sup>Average of the discrimination indexes for items in a subtest based on the difference between the upper and lower halves, on total score for the given subtest or composite.

<sup>b</sup>Additive total for subtests 1, 2, 3, 4, 5, 6, and 7.



Table 6

Means and Standard Deviations of the Anxiety Subtest Scores  
for the Programed and Conventional Treatment Groups<sup>1</sup>

Variable Name Anxiety Subtest Score	Programed <sup>a</sup>		Conventional <sup>b</sup>	
	<u>X</u>	<u>SD</u>	<u>X</u>	<u>SD</u>
1. General Emotionality	37.48	29.90	38.66	30.41
2. Generalized School Anxiety	31.47	26.19	34.27	26.54
3. General Classroom Anxiety	39.80	21.26	39.90	22.27
4. Peer Anxiety	26.75	23.70	28.06	23.41
5. Parental Pressure for Achievement	49.34	24.43	49.54	24.05
6. Teacher Anxiety	45.95	17.49	46.26	17.41
7. Test Anxiety	46.34	26.88	49.40	26.11
8. Total Anxiety	40.99	15.16	42.02	15.11

<sup>1</sup>All scores converted to per cents.

<sup>a</sup>N = 494.

<sup>b</sup>N = 506.

#### 2.4: Instructional Treatment Conditions

##### The Programed Teaching Condition

Students in the programed condition received instruction from a revised version of the Improving Reading Vocabulary (IRV) program, designed originally by Professor Glock and Fred Shepman of Cornell. The general objective of the program can be described as vocabulary development. More specifically, the program was designed to teach the meanings and usage of 24 word elements (affixes and combining forms) with relatively constant meanings such as bi-, bio-, and neuro-, and 115 words containing one of the word elements. In addition, the program attempted to develop skills in ascertaining context clues relevant to inferring the meanings of word elements and words not known by the student.

The IRV program was organized into ten lessons printed in booklet form on five- by eight-inch paper. Each lesson consisted

of about 30 pages of material and was presented in a cardboard holder with a sliding answer panel. The material in the program was written in a style called conversational chaining, and required the student to construct one or more responses at intervals throughout the lesson. The number of responses per lesson varied from a low of 29 for lesson one to a high of 84 for lesson two. The program contained a considerable amount of prose designed to maintain student interest and provide a context for teaching the word elements and words. The "story-like" character of the program had the effect of introducing considerable variability in frame length (intervals between responses). Across lessons, the number of words per frame varied from a single word to 130 words.

Prior to its use in the research, the original IRV program was revised on a pilot sample in two stages. The first stage involved administration of the program to a small sample of eighth graders, and was followed by extensive rewriting. In the second stage, the revised version of the program was administered to more than 3000 eighth graders in ten widely separated schools during ten periods of the regularly scheduled English classes. Qualitative and quantitative data available from this trial indicated that no further changes were needed. Teacher and student reaction to the program was highly favorable. The average student could generally finish a given lesson from the program in 30 minutes of class time and demonstrate satisfactory achievement of the program objectives. The overall error rate for the program was less than ten per cent, and did not exceed 15 per cent for any individual frame. Appendix F presents a more detailed account of the procedures used in validating the program as well as a list of the specific program objectives, the words and word elements taught in the program, and a sample lesson.

The materials used for instruction during the experimental year consisted of copies of the revised version of the IRV program, the program holders, and a set of standard instructions which detailed the procedures for teacher use of the program. Prior to the initiation of instruction, the investigators met with the participating teachers in the 22 schools and explained the procedures for using the program in the context of the study. The major points of emphasis were as follows:

- (a) Students were to be informed that they were participating in an experiment sponsored by Cornell University. Students were further informed that instruction from the program would be treated as a normal part of the classroom program. The

student would be tested on completion of the program and the resultant scores would be made available to the teachers.

- (b) The necessity of writing out the responses to the frames in the program before uncovering the answer was emphasized to the student. Teachers were encouraged to observe the student's performance in this respect and examine his response sheet when he concluded the lesson. Introducing the student to the rationale and procedures of programmed instruction was accomplished in lesson one of the program.
- (c) Students were allowed to complete each daily lesson at their own rates. Teachers were asked to caution students who proceeded through the program carelessly or too rapidly for effective learning. Students who appeared to be proceeding through the program at a rate insufficient to complete a given lesson during the class period were encouraged to proceed more rapidly. The instructional materials were collected each day when the student had completed the given lesson.
- (d) The student was not allowed to use the program outside of the school, but could complete a lesson missed because of absence, during a study period.
- (e) Teachers were requested not to give direct aid to students who inquired about the meaning of the content of the program. These and similar inquiries were to be handled in general by redirecting the student through previous frames.

#### The Conventional Teaching Condition

Prior to beginning the study, teachers in the conventional condition were provided with a 94-page lesson guide, 35 copies of a 45-page supplementary materials booklet, a set of 10 slides, and a 15-minute tape recording. The teaching guide detailed the research requirements of the conventional teaching situation and provided the teacher with a set of ten lesson plans designed to correspond with the content of the IRV lessons. Lessons in the teaching guide were organized into parts given in order as follows: objectives, review, introduction, lesson body, practice, summary or review, and test. The supplementary materials booklet contained short objective tests for lessons two through ten, an IRV



dictionary which listed pronunciations and definitions for the IRV words and word elements, and original stories and practice exercises written for some of the lessons. The lesson plans were highly detailed -- even to the point of indicating the cues and content suggested for discussion exercises. Student-teacher verbal interaction was heavily emphasized, and an attempt was made to incorporate widely accepted techniques and methods (e.g., a tape recording, slides, original prose, a skit, etc.). The contents, format, and organization of the lesson plans, as well as a sample lesson from the teaching guide are presented in Appendix F.

As indicated previously, the conventional instruction condition was scheduled within schools to correspond, lesson for lesson, with the programed condition. Directions for teaching the lessons emphasized that the specific content of the lesson outlined in the lesson body was to be taught to the students on the day indicated. It was also emphasized that the particular words and word elements in a given lesson were to be taught in that lesson, and not carried over into the next day's session. The teacher, however, was free to deviate from the methods and approaches suggested in the lesson plans. Specifically, this meant that the teacher need only have attended to instructing the students in the meanings of the words and word elements for a given lesson (i.e., the content specified in the lesson body), and provide them with practice in finding and interpreting context clues.

## 2.5: The Dependent Variables

The objectives and approach used in the development of the criterion test were roughly similar to those used in constructing the personality measures. Generally, this involved the development of item types designed to measure specific kinds of achievement (the objectives of instruction), and empirical verification of these using the technique of factor analysis on data obtained from samples selected from the pilot population. The content of the criterion test and the history of its development are described in Appendix G. The final form of the criterion test used during the experimental year of the research consisted of 31 items distributed in the following four item formats:

- (a) 19 multiple choice items with four choices per item.
- (b) 3 items in which the student identified a taught word element in the context of an unknown word.



- (c) 3 items for which the student was asked to write a word element given its definition.
- (d) 6 items which required the student to generate many possible meanings of an untaught word, based on a clue given for the meaning of part of the word and the context in which the word was given.

Thirty-five minutes were allowed for completion of the test. This proved to be sufficient time for students to attempt every item in the test.

Three subtest scores and a total score were derived from the criterion test. The recall subtest consisted of 12 of the objective items; each correct response was given a score of one. The remaining 13 objective items were scored for transfer; one point was given for each correct response. The hypotheses making subtest consisted of the six items described in d, above. Each different relevant response per item was given one-half point, but no more than four were scored for an item. Thus, the total possible score for hypotheses making was 12 (two points per item). Total score on the criterion test was the simple sum of the scores for the three subtests. Maximum possible score was 37 (12 + 13 + 12).

Table 7 presents descriptive data, internal reliabilities, and mean item discriminations for the criterion test scores, based on the administration of the test to the total sample in the experimental year. Means and standard deviations of the test scores for the programed and conventional groups are also shown. These data may be summarized as follows. The recall subtest scores for the total sample evidenced higher internal reliability and greater mean discrimination power than the transfer subtest score. The lower internal reliability and mean discrimination power for the latter subtest was expected since the items retained for use in this subtest were more heterogeneous (see Appendix G). It was not possible to compute internal reliabilities for the hypotheses making subtest due to the nature of this data, nor for the total criterion score which included this subtest score. Finally, the reader may note that the means for recall, hypothesis making and total criterion tests were higher for subjects in the conventional condition. Differences in variability of the four scores between the two groups, however, are slight.

Table 7

Descriptive Statistics for the Criterion Test Scores Based on the  
Programed, Conventional, and Combined Treatment Groups<sup>1</sup>

	Programed <sup>a</sup>		Conven- tional <sup>b</sup>		Combined <sup>c</sup>		<u><math>\bar{X}</math></u> Disc	K-R 20 Rel.
	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>		
1. Recall	6.18	2.87	8.27	2.52	7.19	2.91	40.9	.74
2. Transfer	8.14	2.15	8.37	2.22	8.26	2.20	26.8	.53
3. Hypotheses Making	3.80	1.56	4.26	1.77				
4. Total	18.12	5.02	20.91	4.86				

<sup>1</sup>

Figures given are for raw scores.

<sup>a</sup>N = 513.

<sup>b</sup>N = 513.

<sup>c</sup>N = 1117. Discrimination indexes are the means of the discrimination indexes for items in a subtest based on the difference between the upper and lower halves on the total score for the given subtest.

<sup>d</sup>Total score is the sum of the scores on the three subtests (maximum scores for each were: 12 + 13 + 12 = 37).

## 2.6: Data Collection, Treatment, and Analysis

A "mark-sense" IBM card system was developed so that all dichotomous and multiple choice responses could be marked by the student directly on data cards. The design of the card was general so that it could be used with any A, B, C, D, and E system of response or part thereof. Each side of the card could record 25 responses. One side of the card also recorded the student's name and was prepunched with numerical codes for school, instrument, and class.

Students recorded their responses with electrographic pencils on the IBM cards for all items in the compulsivity, anxiety, and exhibitionism tests, the first 19 items in the criterion test,

and the items included in the Object Uses Test. Scores for the creativity protocols and the remaining items in the criterion test were marked with electrographic pencil on cards by clerks. A specially designed mark-sense card, which could be used for recording larger numbers, was used for entering the scores for the four tests of verbal creativity.

An additional mark-sense card, the student data card, was used for recording the student's mental age score, his school and class code, teacher ratings of the four personality characteristics, and other data such as the student's English and standardized achievement test marks. With the exception of the mental age scores, these data are referred to in the appropriate appendixes.

Students' electrographic responses on the various cards were checked visually for appropriate marking. Responses on the cards were then "sensed" by machine and punched directly onto the cards used in the data analyses. Errors in punching due to mistakes in marking or omissions (or any other reason) were close to one per cent of the total.

For use in the analyses, students' raw scores on the measures of compulsivity (two scores), exhibitionism (one score), and anxiety (eight scores) were converted to per cents. Scores for the five measures of verbal creativity and the total creativity minus convergent thinking scores were standardized to a mean of 100 and a standard deviation of 20. Raw scores were used for mental age and the four dependent variable measures of achievement.

For each personality variable (subtest scores and/or total score), four separate analyses of variance were conducted using, in turn, the three subtests and total score on the three criterion tests as dependent variables. The independent variables in this four-way, completely crossed, fixed model design were learning condition (programed-conventional), mental age (above and below the median for the school), personality level (above and below the median for the school), and sex. The 22 schools served as replicates in the analyses. The unit of analysis was the mean criterion test score for all students in a given class (i.e., learning condition), having the same classification on sex, mental age, and the personality variable under consideration.

Replications across schools ("within cell") served as the denominator of the F-ratios. The degrees of freedom for replications varied somewhat among the analyses for the personality

variables in that the number of missing data points to be estimated was a function of the relationship between the personality variable under consideration and the other three independent variables.<sup>1</sup>

In all, 68 analyses of variance were conducted, one for each personality variable on each of four criterion test scores. In each of these analyses, significance tests were computed for all main effects and the interactions. The tests of significance for the interaction of each personality variable and instructional condition on each of the four dependent variables constituted the appropriate statistical tests addressing the major research questions raised by the study.

Correlations were computed among the 44 independent variables included in the study. These included the 20 independent or classificatory variables used in the analyses of variance and 24 additional variables consisting of the seven compulsivity subtest scores, a total compulsivity score, the Object Uses Test score, an additional criterion test score combining the recall and transfer subtests, and the personal data included in the student data cards. This is information of general interest to the reader and has been placed in Appendix H.

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<sup>1</sup>The double interaction between personality and condition was of primary interest, and the original plan was to treat schools as a fifth random, independent classification. However, the roughly 25 missing cells, on the average, would have left the appropriate error term (the triple interaction) with no degrees of freedom.



## SECTION 3

### RESULTS

Results of the tests of the hypotheses based on the rationale outlined in Section 1 are presented in tabular form in sections 3.1, 3.2, 3.3, and 3.4, separately for each of the four personality variables. Each of 17 tables shows mean square and F values with associated significance levels for the main effects of sex, mental age, instructional condition, the personality variable under consideration (subtest and/or total score), and the possible double interactions of these main effects on each of four criterion test scores. Higher-order interactions were nonsignificant in all analyses and have been eliminated in the tables. The corresponding values of the cell means for each of these analyses of variance tables are shown in Appendix I. The cell mean tables are presented in an order and format corresponding with the order and format of the analyses of variance tables given in sections 3.1, to 3.4.

Additional data which the reader may find of further use in interpreting the results section are presented in Appendix H. This Appendix H presents the means, standard deviations, and intercorrelations of the independent variables separately for the programed, conventional, and combined groups.

#### 3.1: Constructive and Unconstructive Compulsivity

Estimated values of the mean squares, F's and significance levels for the main effects and double interactions obtained in the analyses of variance for constructive and unconstructive compulsivity are shown in Tables 8 and 9. The corresponding cell means for the four criterion test scores are presented in Tables 75 and 76 in Appendix I.

The test relevant to the rationale described in Section 1 for compulsivity is the interaction of each of the compulsivity subscores with instructional condition. The nonsignificant Fs for this interaction shown in Tables 8 and 9 indicate that the hypothesis relating compulsivity to differential achievement in the programed and conventional modes of instruction was not supported.

The results of the tests of significance for the main effects of sex, mental age, instructional condition, constructive and

Table 8

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Constructive Compulsivity  
on Four Achievement Test Scores

Source	df	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	6.50	1.33	.14	.05	.00	.00	.00	.00	8.35	.49		
Mental Age	1	149.92	30.64***	110.77	38.32***	16.08	8.70***	716.89	41.90***				
Condition	1	353.60	72.26***	6.01	2.08	14.49	7.84**	627.98	36.71***				
Constructive Compulsivity	1	4.05	.83	2.77	.96	.43	.23	18.81	1.10				
Sex x Mental Age	1	2.03	.41	6.36	2.20	2.09	1.13	29.11	1.70				
Sex x Condition	1	.17	.03	3.72	1.29	.25	.14	4.05	.24				
Sex x Const. Comp.	1	.18	.04	.00	.00	.70	.38	1.69	.10				
Mental Age x Condition	1	.34	.07	.06	.02	.01	.00	.07	.00				
Mental Age x Const. Comp.	1	2.06	.42	4.36	1.51	.54	.29	18.16	1.06				
Condition x Const. Comp.	1	.97	.20	2.74	.95	.20	.11	4.81	.28				
Within	315	4.89	—	2.89	—	1.85	—	17.11	—				
Total	330	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 9

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Unconstructive Compulsivity  
on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	F
Sex	1	9.86	2.15	.00	.00	.00	.02	.01		10.61		.65	
Mental Age	1	156.66	34.21***	112.30	45.37***	17.51	9.76***			745.19		45.73***	
Condition	1	380.04	82.99***	2.92	1.18	12.68	7.07**			613.06		37.62***	
Unconst. Compulsivity	1	.09	.02	.61	.25	3.67	2.05			8.96		.55	
Sex x Mental Age	1	1.28	.28	5.60	2.26	.98	.55			20.16		1.24	
Sex x Condition	1	.26	.06	1.84	.75	.49	.28			6.61		.41	
Sex x Unconst. Comp.	1	2.32	.51	.53	.22	1.49	.83			1.06		.07	
Mental Age x Condition	1	3.08	.67	.06	.03	.40	.22			6.92		.42	
Mental Age x Unconst. Comp.	1	1.14	.25	4.53	1.83	.18	.10			.41		.02	
Condition x Unconst. Comp.	1	.01	.00	.80	.32	1.34	.75			4.60		.28	
Within	312	4.58	—	2.48	—	1.79	—			16.30		—	
Total	327	—	—	—	—	—	—			—		—	

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

unconstructive compulsivity, and the remaining double interactions shown in Tables 8 and 9 are summarized as follows. The  $F$ s for sex were nonsignificant on all four criterion test scores. The  $F$ s for the main effect of mental age were significant on recall ( $p < .005$ ), transfer ( $p < .005$ ), hypotheses making ( $p < .005$ ), and total criterion ( $p < .005$ ).  $F$ s for the main effect of instructional condition were significant for recall ( $p < .005$ ), hypotheses making ( $.01 > p > .005$ ), and total criterion ( $p < .005$ ), but was nonsignificant for transfer ( $p < .05$ ). All  $F$ s for the main effects of constructive and unconstructive compulsivity and the possible double interactions of sex, mental age, and instructional condition on the four criterion tests scores were nonsignificant ( $p < .05$ ).

The significant main effects for mental age and condition may be interpreted by reference to tables 75 and 76 which present the cell means for  $S$ s classified high and low on mental age and programed-conventional condition in the analyses for constructive and unconstructive compulsivity. These results show that  $S$ s above the median on mental age obtained significantly higher mean scores for recall, transfer, hypotheses making, and total criterion. The means for condition indicate a facilitating effect for the conventional condition as shown by the significantly higher mean scores obtained by subjects in the conventional condition for recall, hypotheses making, and total criterion.

The results for the main effects of sex, mental age, condition, and the possible double interactions of these variables, noted above in the analyses for constructive and unconstructive compulsivity, are consistent with the results obtained in the analyses of all other personality variables. To avoid unnecessary repetition, these secondary findings are outlined below. The reader is referred to Tables 8 through 24 in this and subsequent sections and to the corresponding tables of cell means given in Appendix I (Tables 75 through 91).

1.  $F$  values for the main effect of sex were nonsignificant in all analyses ( $p < .05$ ). The tables of means given in Appendix I show that there were only slight differences for the sexes on the four criterion test scores.

2. Tables 8 to 24 show that the  $F$ s for mental age were significant in all analyses on recall, transfer, hypotheses making, and total criterion. Reference to Tables 75 through 91 in Appendix I shows that  $S$ s with mental age scores above the median achieved significantly higher criterion test scores.



Across analyses, the  $F$ s for mental age were significant beyond the .005 level on recall and total criterion, but varied from  $.05 > p > .01$  to  $p < .005$  on the hypotheses making subtest.

3. The  $F$ s for condition were significant for recall, hypotheses making, and total criterion, but were nonsignificant for transfer. The cell mean tables in Appendix I indicate that the conventional treatment Ss obtained the higher mean scores on recall, hypotheses making, and total criterion. Across analyses, the  $F$ s for condition were significant beyond the .005 level on recall and total criterion, but varied from  $.05 > p > .01$  to  $p < .005$  on the hypotheses making subtest.

4. Generally, the  $F$  values for condition were approximately twice as large as those for mental age on the recall subtest score, suggesting that the conventional treatment condition facilitated recall to a greater extent than mental age.

5. Across analyses, the  $F$  values for mental age and condition were roughly equivalent on the hypotheses making subtest, although there was a tendency for the mental age  $F$ s to more often attain larger values and higher levels of significance. Significance levels of the  $F$ s for mental age and instructional condition on hypotheses making varied from  $.05 > p > .01$  to  $p < .005$ , across analyses for each personality variable. Both the  $F$  values given in Tables 8 through 24 and the corresponding cell means shown in Appendix I for the main effects of mental age and condition indicate that the facilitating effects of these variables on the hypotheses making subtest were considerably smaller than for their effects on recall and total criterion.

6. Relative comparisons of the  $F$  values for the main effects of mental age and instructional condition on total criterion indicate that these variables had roughly equivalent effects on the combined criterion score.

7. Finally, it is to be noted that only one of the possible double interactions calculated for sex, mental age, and condition in each personality variable analysis was significant. This was the interaction of mental age and creativity total on transfer ( $.05 > p > .01$ ) shown in Table 24. The interaction was apparently due to the combined positive effects of both mental age and total creativity on transfer (see Table 91 in Appendix I).

In the remainder of this section, presentation of the results from the analyses for exhibitionism, anxiety, and creativity, is limited to the findings for the test of the interaction of

each personality variable with instructional condition, and the main effects of the personality variables.

### 3.2: Exhibitionism

Table 10 shows the mean square and  $F$  values for the main effects and double interactions obtained in the analyses of variance for exhibitionism. Table 77 in Appendix I presents the corresponding cell means for the analyses of variance. The results for the test of the interaction of exhibitionism and instructional condition on the four criterion test scores show that none of the interactions were significant. The main effect of exhibitionism on the four criterion test scores was also non-significant. As with the analyses for compulsivity, it is evident that the results do not support the hypothesis concerning the interaction of exhibitionism and instructional condition on achievement.

### 3.3: Anxiety

Mean square and  $F$  values for the main effects of sex, mental age, instructional condition, each of the eight anxiety scores, and the double interactions of these variables are presented in Tables 11 through 18. The corresponding cell means are shown in Tables 78 through 85 in Appendix I. Again, the test of prime interest is the interaction of each of the anxiety variables with instructional condition, programmed-conventional. Tables 11 through 18 show that in each analysis for a different anxiety score, none of the  $F$ s for the interaction of anxiety and instructional condition was significant.

However, several of the main effects for anxiety were significant. Table 11 indicates that the  $F$  for generalized school anxiety was significant on the transfer subtest ( $.05 > p > .01$ ). The main effect of general classroom anxiety shown in Table 12 was significant on recall ( $.05 > p > .01$ ), transfer ( $p < .005$ ), and total criterion ( $.01 > p > .005$ ). Table 13 shows that the  $F$ s for parental pressure for achievement were significant on hypotheses making ( $.01 > p > .005$ ), and total criterion ( $.05 > p > .01$ ). The  $F$  for the main effect of test anxiety shown in Table 14 was significant for the transfer subtest ( $.05 > p > .01$ ), and the  $F$ s for total anxiety (Table 18) were significant on transfer ( $.01 > p > .005$ ) and total criterion ( $.05 > p > .01$ ).

Table 10

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Exhibitionism  
on Four Achievement Test Scores

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Sex	1	8.38	1.68	.00	.00	.00	.32	.19	11.79	.73			
Mental Age	1	158.95	31.91***	124.55	50.58***	14.32	8.49***	759.14	46.83***				
Condition	1	395.21	79.35***	4.14	1.68	14.65	8.68***	662.67	40.88***				
Exhibitionism	1	1.87	.38	1.24	.50	.04	.02	.20	.01				
Sex x Mental Age	1	2.25	.45	6.37	2.59	1.21	.72	26.24	1.62				
Sex x Condition	1	.82	.16	3.78	1.54	.05	.03	6.94	.43				
Sex x Exhibitionism	1	1.40	.28	.01	.00	1.25	.74	5.68	.35				
Mental Age x Condition	1	.71	.14	.00	.00	.35	.21	2.22	.14				
Mental Age x Exhibitionism	1	2.07	.42	1.17	.47	.03	.02	7.20	.44				
Condition x Exhibitionism	1	11.24	2.26	.00	.00	3.32	1.97	26.86	1.66				
Within	316	4.98	—	2.46	—	1.69	—	16.21	—				
Total	331	—	—	—	—	—	—	—	—				

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p



Table 11

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Generalized School Anxiety  
on Four Achievement Test Scores

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>F</u>
Sex	1	14.26	2.79	.00	.00	.00	.08	.04	.04	16.78		.94	
Mental Age	1	131.04	25.67***	103.93	35.88***	13.40	7.49**	640.17	35.76***				
Condition	1	361.65	70.85***	8.63	2.98	12.38	6.92**	648.40	36.22***				
Generalized School Anx.	1	7.88	1.54	18.83	6.50*	.17	.09	57.01	3.18				
Sex x Mental Age	1	5.08	.99	3.17	1.10	.00	.00	16.41	.92				
Sex x Condition	1	.02	.00	.94	.32	.15	.08	2.24	.13				
Sex x Gen. Sch. Anx.	1	1.53	.30	1.63	.56	.08	.04	5.01	.28				
Mental Age x Condition	1	1.64	.32	.00	.00	.01	.00	1.54	.09				
Mental Age x Gen. Sch. Anx.	1	.66	.13	.17	.06	2.11	1.18	7.18	.40				
Condition x Gen. Sch. Anx.	1	1.16	.23	.05	.02	.37	.21	.06	.00				
Within	311	5.10	—	2.90	—	1.79	—	17.90	—				
Total	326	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p



Analyses of Variance for Sex, Mental Age, Instructional Condition, and General Classroom Anxiety  
on Four Achievement Test Scores

Table 12

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Sex	1	13.12	2.64	.53	.21	.55	.30	25.89	1.54				
Mental Age	1	129.52	26.05***	108.73	42.57***	17.51	9.45***	675.66	40.32***				
Condition	1	407.47	81.97***	5.08	1.99	15.16	8.18***	693.57	41.39***				
Gen. C-R	1	26.63	5.36*	24.56	9.61***	2.29	1.24	135.41	8.08**				
Sex x	1	3.36	.68	3.64	1.43	.51	.27	19.84	1.18				
Mental Age	1	.61	.12	2.00	.78	.09	.05	6.22	.37				
Condition	1	.05	.01	.01	.00	.19	.10	.08	.01				
Gen. C-R x	1	3.37	.68	.53	.21	.01	.00	6.18	.37				
Mental Age x	1	.02	.00	.17	.07	5.81	3.14	4.46	.27				
Gen. C-R x	1	.28	.06	1.06	.42	.04	.02	3.09	.18				
Condition x	1	4.97	—	2.55	—	1.85	—	16.76	—				
Gen. C-R x	312	—	—	—	—	—	—	—	—				
Within	327	—	—	—	—	—	—	—	—				
Total	327	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 13

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Parental Pressure for Achievement  
on Four Achievement Test Scores

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>	
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>F</u>
Sex	1	8.75	1.84		.29	.11	1.40		.78	5.36		.32
Mental Age	1	144.23	30.33***		114.72	42.53***	8.72		4.87*	659.14		39.93***
Condition	1	403.90	84.93***		10.33	3.83	19.86		11.11***	770.90		46.70***
Par. Press. Achievement	1	17.36	3.65		5.18	1.92	13.26		7.42**	101.65		6.16*
Sex x Mental Age	1	4.32	.91		5.27	1.96	.01		.01	20.04		1.21
Sex x Condition	1	.56	.12		4.23	1.57	.08		.05	6.33		.33
Sex x P. P. Achiev.	1	3.44	.72		.14	.05	1.69		.95	7.72		.47
Mental Age x Condition	1	4.89	1.03		.73	.27	.32		.18	3.69		.33
Mental Age x P. P. Achiev.	1	3.92	.82		.20	.08	1.59		.89	13.62		.83
Condition x P. P. Achiev.	1	.33	.07		2.17	.80	.88		.49	3.37		.20
Within	315	4.76	—		2.70	—	1.79		—	16.51		—
Total	330	—	—		—	—	—		—	—		—

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 14

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Test Anxiety  
on Four Achievement Test Scores

Source	df	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		MS	F	MS	MS	F	MS	MS	F	MS	F	MS	F
Sex	1	18.71	3.49	.25	.09	.00	.00	.00	.00	23.54	1.27		
Mental Age	1	148.36	27.69***	123.94	44.60***	14.74	8.27***			737.27	39.87***		
Condition	1	380.52	71.01***	4.17	1.50	9.98	5.60*			610.35	33.01***		
Test Anxiety	1	4.67	.87	13.30	4.79*	3.44	1.93			58.75	3.18		
Sex x Mental Age	1	3.74	.70	5.08	1.83	.07	.04			19.88	1.08		
Sex x Condition	1	1.52	.28	.96	.35	.01	.01			5.36	.29		
Sex x Test Anx.	1	5.51	1.03	2.68	.96	.87	.49			24.19	1.31		
Mental Age x Condition	1	.41	.08	.32	.12	.14	.08			.21	.01		
Mental Age x Test Anx.	1	.91	.17	.95	.34	1.15	.65			9.02	.49		
Condition x Test Anx.	1	.00	.00	1.48	.53	.53	.30			.26	.01		
Within	307	5.36	—	2.78	—	1.78	—			18.49	—		
Total	322	—	—	—	—	—	—			—	—		

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 15

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Peer Anxiety  
on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	6.96	1.33		.20	.08	.39		.25	13.77		.85	
Mental Age	1	162.25	31.04***	125.65		53.65***	29.64		18.47***	863.91		53.38***	
Condition	1	376.08	71.94***	11.64		4.97	12.12		7.55**	690.62		42.67***	
Peer Anxiety	1	1.37	.26	4.01		1.71	1.21		.75	3.72		.23	
Sex x Mental Age	1	3.86	.74	6.82		2.91	.81		.50	29.97		1.85	
Sex x Condition	1	.40	.08	2.47		1.06	.19		.12	6.98		.43	
Sex x Peer Anxiety	1	.03	.01	3.84		1.64	.24		.15	5.27		.33	
Mental Age x Condition	1	1.06	.20	.04		.02	.02		.01	1.24		.08	
Mental Age x Peer Anxiety	1	1.48	.28	.68		.29	1.71		1.06	.54		.03	
Condition x Peer Anxiety	1	.38	.07	.09		.04	2.12		1.32	3.16		.20	
Within	321	5.23	—	2.34		—	1.60		—	16.18		—	
Total	336	—	—	—		—	—		—	—		—	

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p



Table 16

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Teacher Anxiety  
on Four Achievement Test Scores

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Sex	1	13.37	2.50		.07	.03	.01		.00	14.63			.86
Mental Age	1	150.17	28.06***	116.63		45.41***	11.02		5.67*	695.62			40.70***
Condition	1	394.43	73.70***	6.03		2.35	22.37		11.51***	731.32			42.79***
Teacher Anxiety	1	.35	.07	1.05		.41	2.51		1.29	4.07			.24
Sex x Mental Age	1	.75	.14	4.83		1.88	.59		.31	14.76			.86
Sex x Condition	1	1.70	.32	2.58		1.01	.11		.06	6.72			.39
Sex x Teach. Ank.	1	10.53	1.97	.47		.18	.14		.07	18.52			1.08
Mental Age x Condition	1	3.53	.66	1.67		.65	.02		.01	.53			.03
Mental Age x Teach. Ank.	1	1.74	.33	.15		.06	1.95		1.00	.22			.01
Condition x Teach. Ank.	1	3.12	.58	2.06		.80	.28		.15	13.99			.82
Within	312	5.35	—	2.57		—	1.94		—	17.09			—
Total	327	—	—	—		—	—		—	—			—

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 17

Analyses of Variance for Sex, Mental Age, Instructional Condition, and General Emotionality  
on Four Achievement Test Scores

Source	df	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Sex	1	6.47	1.35	.26	.11	.06	.04	10.89	.68				
Mental Age	1	146.52	30.52***	109.82	45.90***	12.41	7.82**	681.38	42.58***				
Condition	1	354.69	73.88***	9.09	3.80	16.63	10.47***	672.01	41.99***				
General Emotionality	1	.72	.15	8.66	3.62	1.73	1.09	26.07	1.63				
Sex x Mental Age	1	2.78	.58	3.41	1.42	.06	.04	14.17	.89				
Sex x Condition	1	.59	.12	1.24	.52	.20	.12	5.40	.34				
Sex x Gen. Emot.	1	.93	.19	.87	.36	.02	.01	.01	.00				
Mental Age x Condition	1	.68	.14	.50	.21	.85	.54	1.08	.07				
Mental Age x Gen. Emot.	1	.45	.09	.91	.38	.11	.07	3.81	.24				
Condition x Gen. Emot.	1	.02	.00	1.56	.65	.15	.10	2.30	.14				
Within	313	4.80	—	2.39	—	1.59	—	16.00	—				
Total	228	—	—	—	—	—	—	—	—				

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 18

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Anxiety Total  
on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	16.46	3.24		.01	.00	.39		.22	22.89		1.36	
Mental Age	1	145.33	28.62***		114.87	47.59***	19.00		10.90***	735.85		43.62***	
Condition	1	379.98	74.82***		4.49	1.86	10.70		6.14*	619.04		36.69***	
Anxiety Total	1	10.55	2.08		16.96	7.03**	1.57		.90	74.34		4.41*	
Sex x Mental Age	1	5.57	1.10		4.86	2.01	1.27		.73	32.50		1.93	
Sex x Condition	1	1.98	.39		1.92	.79	.09		.05	9.56		.56	
Sex x Anxiety Tot.	1	.01	.00		1.03	.43	.56		.32	.13		.01	
Mental Age x Condition	1	.81	.16		.32	.13	.26		.15	.72		.04	
Mental Age x Anxiety Tot.	1	.86	.17		.03	.01	2.83		1.62	7.75		.46	
Condition x Anxiety Tot.	1	.41	.08		1.12	.46	.02		.00	3.31		.20	
Within	311	5.08	—		2.41	—	1.74		—	1.69		—	
Total	326	—	—		—	—	—		—	—		—	

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

The cell means shown for the main effects of the anxiety variables in Tables 78 through 85 given in Appendix I indicate that high anxiety was associated with lower mean criterion scores in nearly all analyses. The two exceptions to this are the comparisons for peer anxiety (Table 82) and teacher anxiety (Table 83) on the recall subtest. However, the difference between each of these pairs of means is minute. Similarly, it may be seen that the significant main effects for anxiety are associated with very small differences between the mean criterion test scores of Ss grouped high and low on the anxiety subtest scores. The lowest mean difference is .39 of a score point, shown in Table 80 for the significant main effect of parental pressure for achievement on hypothesis making. The highest mean difference is 1.1 score points, shown in Table 80 for parental pressure for achievement on the combined criterion test score.

Before turning to the results for the creativity variables, it seems appropriate to take note of certain consistencies and limitations with respect to the findings for the main effects of anxiety on achievement. First, the significant main effects obtained for five of the anxiety subtest scores have not been considered independently of each other in the analyses. Since the various anxiety scores are intercorrelated, a different type of analysis taking this into account might give different results. Second, the negative effect of anxiety on achievement was most consistently obtained on the transfer subtest score. Four of the anxiety scores -- the three subtest scores generalized school anxiety, general classroom anxiety, test anxiety, and the total anxiety score -- had significant main effects on transfer. In contrast, only the  $F$  for general classroom anxiety was significant on the recall subtest, and the only significant  $F$  on the hypothesis making subtest was obtained for parental pressure for achievement. The three significant  $F$ s for the anxiety variables on total criterion of course reflect in part, the main effects of the anxiety variables on the more specific criterion subtest scores.

### 3.4: Creativity

Tables 19 through 24 present values of the mean squares,  $F$ s, and significance levels for the main effects and double interactions obtained in the analyses of variance for the six creativity scores. The corresponding cell means of the four



criterion test scores for each of these analyses of variance are given in Appendix I. Tables 19 through 24 show that in each of the analyses for a different creativity variable, none of the  $F$ s for the interaction of the creativity variable under consideration with instructional condition was significant. The results for all personality variables, therefore, fail to support the major hypotheses of the study concerning the interactions of personality and instructional condition.

There were six main effects of the creativity variables which were significant. Tables 19 and 20 show that the  $F$ s for the imagination subtest and total creativity minus convergent thinking were significant on the transfer criterion ( $.05 > p > .01$ ). The remaining significant main effects were obtained on the hypothesis-making subtest score for imagination ( $.01 > p > .005$ ), flexibility ( $.05 > p > .01$ ), originality ( $p < .005$ ), and creativity total ( $p < .005$ ), and are shown in Tables 19, 21, 22, and 24, respectively.

The significant main effects for the creativity variables may be interpreted by reference to Tables 86 through 91 in Appendix I. Table 86 shows that the  $F$  for imagination on transfer was due to the higher mean score obtained by  $S$ s above the median on the imagination subtest as compared to those below the median. The significant  $F$  for total creativity minus convergent thinking on transfer was attributable to the higher mean of the  $S$ s below the median on this score as compared to those above the median. These two findings suggest that transfer is facilitated both by verbal creativity (imagination) and convergent thinking ability (creativity total minus convergent thinking ability). The significant  $F$ s for imagination, flexibility, originality, and creativity total on the hypothesis-making subtest were due to the higher mean scores for  $S$ s above the median on each of these independent variables as compared to those below the median. The differences between the means for the significant main effects of the creativity variables, however, were quite small. For the main effects of imagination and total creativity minus convergent thinking on transfer, the mean differences were respectively .35 and .48 score points (see Tables 86 and 87). For the main effects of imagination, flexibility, originality, and total creativity on hypothesis-making, the mean differences ranged from a low of .29 score points to a high of .50 score points (see Tables 86, 88, 89, and 91).

Table 19

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Imagination  
on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	7.11	1.30	.01	.00	.34	.18						
Mental Age	1	145.03	26.56***	103.51	39.30***	13.33	10.00***						
Condition	1	333.23	61.03***	4.18	1.59	11.97	6.53*						
Imagination	1	.18	.03	10.42	3.96*	13.57	7.41**						
Sex x Mental Age	1	.84	.15	1.60	.61	.70	.38						
Sex x Condition	1	2.58	.47	1.90	.72	.20	.11						
Sex x Imagination	1	3.23	.59	4.79	1.82	3.71	2.03						
Mental Age x Condition	1	2.25	.41	.21	.08	.75	.41						
Mental Age x Imagination	1	4.45	.82	.81	.31	.04	.02						
Condition x Imagination	1	.00	.00	1.13	.43	1.71	.93						
Within	286	5.46	—	2.63	—	1.83	—						
Total	301	—	—	—	—	—	—						

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 20

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Creativity  
Total Minus Convergent Thinking on Four Achievement Test Scores

Source	df	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		MS	F	MS	MS	F	MS	MS	F	MS	F	MS	F
Sex	1	16.74	3.32	1.23	1.23	.43	.00	.00	.00	27.06	1.52		
Mental Age	1	122.54	24.33***	104.34	104.34	36.18***	17.74	17.74	10.36***	650.05	36.48***		
Condition	1	373.03	74.05***	10.05	10.05	3.50	8.00	8.00	4.67*	641.01	35.98***		
Creativity T. -Conv. Think.	1	2.58	.51	19.14	19.14	6.66*	.27	.27	.15	29.89	1.68		
Sex x Mental Age	1	1.79	.36	4.58	4.58	1.59	2.02	2.02	1.18	23.98	1.35		
Sex x Condition	1	1.49	.30	6.78	6.78	2.36	1.74	1.74	1.01	26.42	1.48		
Sex x Cr. T.-Con. T.	1	3.47	.69	.09	.09	.03	.19	.19	.11	2.98	.17		
Mental Age x Condition	1	5.64	1.12	.13	.13	.05	.01	.01	.01	8.16	.46		
Mental Age x Cr. T.-Con. T.	1	2.61	.52	.43	.43	.15	.78	.78	.46	1.92	.11		
Condition x Cr. T.-Con. T.	1	.42	.08	.16	.16	.05	.13	.13	.10	.46	.03		
Within	296	5.04	—	2.88	2.88	—	1.71	1.71	—	17.82	—		
Total	311	—	—	—	—	—	—	—	—	—	—		

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 21

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Flexibility  
on Four Achievement Test Scores

<u>Source</u>	<u>df</u>	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>	
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>F</u>
Sex	1	15.35	3.01	.00	.00	.00	.00	.00	.00	15.76	.95	
Mental Age	1	145.19	28.46***	116.48	43.61***	20.56	13.73***	749.39	45.20***			
Condition	1	354.67	69.53***	10.27	3.85	8.09	5.40*	618.99	37.34***			
Flexibility	1	.23	.05	1.22	.46	9.85	6.58*	6.32	.38			
Sex x Mental Age	1	2.50	.49	3.99	1.50	4.00	2.67	31.14	1.88			
Sex x Condition	1	.47	.09	4.36	1.63	2.16	1.44	18.04	1.09			
Sex x Flexibility	1	.86	.17	1.27	.48	1.60	1.07	11.03	.67			
Mental Age x Condition	1	2.35	.46	.04	.02	.14	.09	.91	.05			
Mental Age x Flexibility	1	2.12	.41	2.71	1.01	.37	.25	.18	.01			
Condition x Flexibility	1	.02	.00	1.79	.67	.00	.00	2.04	.12			
Within	299	5.10	—	2.67	—	1.50	—	16.58	—			
Total	314	—	—	—	—	—	—	—	—			

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p



Table 22

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Originality  
on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	F
Sex	1	11.56	2.36	.04	.01	.01	.02	.01	.01	11.14		.70	
Mental Age	1	137.92	28.17***	106.97	41.75***	19.32	11.71***	701.32	43.90***				
Condition	1	369.12	75.38***	5.97	2.33	9.29	5.63*	610.34	38.20***				
Originality	1	1.12	.23	6.67	2.60	13.78	8.35***	27.46	1.72				
Sex x Mental Age	1	1.51	.31	1.99	.78	3.16	1.91	19.47	1.22				
Sex x Condition	1	1.23	.25	4.00	1.56	.01	.00	9.18	.57				
Sex x Originality	1	.37	.08	.05	.02	1.86	1.13	.29	.02				
Mental Age x Condition	1	3.39	.69	.11	.04	.05	.03	2.99	.19				
Mental Age x Originality	1	1.26	.26	6.28	2.45	.43	.26	8.88	.56				
Condition x Originality	1	2.00	.41	.95	.37	1.96	1.19	.93	.06				
Within	296	4.90	—	2.56	—	1.65	—	15.98	—				
Total	311	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 23

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Fluency  
on Four Achievement Test Scores

Source	df	<u>Recall</u>			<u>Transfer</u>			<u>Hyp. Making</u>			<u>Total</u>		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	9.03	1.76	.02	.01	.01	.01	.01	.01	.01	8.81	.51	
Mental Age	1	145.87	28.47***	90.15	35.91***	19.05	11.96***	673.26	38.66***				
Condition	1	350.86	68.47***	7.67	3.06	12.83	8.05**	629.11	36.12***				
Fluency	1	1.85	.36	.49	.19	3.93	2.47	.01	.00				
Sex x Mental Age	1	.69	.14	2.20	.87	3.34	2.10	17.12	.98				
Sex x Condition	1	.47	.09	.85	.34	.13	.08	3.87	.22				
Sex x Fluency	1	7.43	1.45	.05	.02	.06	.03	10.17	.58				
Mental Age x Condition	1	2.24	.44	.14	.06	.11	.07	2.43	.14				
Mental Age x Fluency	1	1.01	.20	.84	.33	2.43	1.53	2.75	.16				
Condition x Fluency	1	.33	.06	.47	.19	.57	.36	.40	.02				
Within	299	5.12	—	2.51	—	1.59	—	17.42	—				
Total	314	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

Table 24

Analyses of Variance for Sex, Mental Age, Instructional Condition, and Creativity Total on Four Achievement Test Scores

Source	df	Recall			Transfer			Hyp. Making			Total		
		MS	F	MS	MS	F	MS	MS	F	MS	MS	F	MS
Sex	1	6.98	1.39	.13	.05	.79	.46	4.43	.27				
Mental Age	1	144.65	28.86***	105.76	41.31***	12.53	7.33**	668.54	40.56***				
Condition	1	375.79	74.99***	8.98	3.51	14.36	8.41***	685.17	41.56***				
Creativity Total	1	.00	.00	2.13	.83	31.44	18.40***	50.76	3.08				
Sex x Mental Age	1	.39	.08	1.63	.64	4.44	2.60	16.13	.98				
Sex x Condition	1	1.40	.28	4.45	1.74	.39	.23	15.35	.93				
Sex x Creat. Tot.	1	1.73	.35	.04	.02	2.57	1.50	9.75	.59				
Mental Age x Condition	1	5.46	1.09	.02	.01	.25	.14	7.31	.44				
Mental Age x Creat. Tot.	1	.00	.00	12.08	4.72*	.48	.28	17.09	1.04				
Condition x Creat. Tot.	1	.14	.03	.27	.11	.13	.08	.28	.02				
Within	300	5.01	—	2.56	—	1.71	—	16.48	—				
Total	315	—	—	—	—	—	—	—	—				

\* .05 > p > .01  
 \*\* .01 > p > .005  
 \*\*\* .005 > p

## SECTION 4

### DISCUSSION

Based on our investigation, the response to the four specific research questions raised in Section 1 is: There was no significant interaction between the personality characteristics selected and type of learning task structure (programed, conventional). Further, few trends toward interaction were noted in the data. The few mild tendencies toward interaction that were observed, moreover (note the cases of exhibitionism and constructive compulsivity), were in a direction opposite to that expected.

We had, of course, expected to find such interactions, and a full discussion of the rationale for the major hypotheses of the study is presented in Section 1. In the present Section we shall concentrate on interpretation of these "negative" results. The reader may wish to refer to Section 1 in order to place this discussion within a meaningful framework.

To paraphrase Bereiter (5), the evaluation of a research investigation should be based on its intent and execution. The results are nature's responsibility. However, when a researcher fails to reject the null hypothesis implicit in a statistical test of the data, the following should be reconsidered: the data gathering instruments, the research design (including treatment conditions), the analysis technique, and the rationale. Weaknesses in any of the first three considerations can lead to failure to reject the null hypothesis when, in fact, it should be rejected. If the null hypothesis is true, of course, it cannot be proved. If careful consideration of the first three points show no weaknesses that would lower the sensitivity or validity of the experiment, the researcher might persuade himself to change his rationale and try again. Let us consider each of these points, then, in turn.

With regard to the data gathering instruments, those specially constructed for the research are of main concern; namely, the measures of compulsivity, creativity, convergent thinking, anxiety, exhibitionism, and the criterion measures of achievement. With the possible exceptions of the creativity subtests and the creativity-convergent thinking difference measure, the personality measures were judged to have acceptable reliability for the purpose of making the necessary dichotomous classifications used in the design. Although some misclassifications were undoubtedly made, the high and low personality groups were judged to be sufficiently different on the trait measured by the given instrument.



Unquestionably, much effort is needed to improve the state of our paper and pencil measures of personality before we can have high confidence in making conclusive statements about results from experiments that use them. Nevertheless, the logical and statistical bases for item creation and selection led us to believe that the measures of the personality variables were sufficiently valid to detect the predicted interactions if they existed under the conditions of the research procedures. The same remark is seen as applicable to the criterion measures as well, where the instruments were viewed as reliably measuring the broad range of objectives and having an appropriate intermediate level of difficulty. To conclude our remarks about this possible source of invalidity, we judge the failure to find the desired interactions cannot be attributed to the data gathering measuring instruments.

Turning to the instructional treatments, it should be noted that, for purposes of controlling the research, they departed somewhat from usual programmed and conventional instruction. There was no homework requirement for either group. The students were exposed to the programmed and conventional conditions only during the regularly scheduled classroom periods. A considerable amount of effort and expertise, at least as much as was devoted to construction of the programmed materials, went into preparation of the lesson guide for the conventional treatment. Both instructional treatments were constructed to be as excellent as we could make them. As such, it could be argued that they were not typical. These atypical conditions restrict the generalizability of the findings. For example, the negative results reported here might not be found for less well prepared instructional materials. Less carefully worked out lesson plans could differ from those of the present "conventional instruction" in ways (such as being less structured) which could then influence learning and lead to the expected interaction.

We are not conjecturing that this would be the case. Rather our intention is merely to emphasize the specific and somewhat atypical nature of the treatments being compared and to indicate that for other instructional treatments the results could be different. We might add, however, that the instructional materials used might not be so different from those used to teach the given knowledges and skills in an idealized classroom situation.

Besides the method of presentation, the conventional teaching situation differed from the programmed treatment in at least one other important respect. This concerned the element of time

spent in learning specific to the instructional objectives. In the conventional condition, time spent in learning each lesson was quite constant for each student in a given classroom, with most differences probably due to such uncontrollable factors as lack of attention and absence. In the programed condition, however, time spent on each lesson was quite variable for a given classroom. Reports from teachers indicated that some students spent roughly 15 to 20 minutes each day on the programed lessons, while others used the entire class period of 40 to 50 minutes across schools. The greater amount of average time spent in the conventional condition on instruction may have been one of the more important factors producing the criterion differences in favor of the conventional subjects.

The major factors within and between the instructional conditions, over which some control was exerted, are listed as follows:

- (a) Class: classes within schools, roughly comparable on mental age, were chosen and randomly assigned to the two learning conditions.
- (b) School: both the programed and conventional classes were in the same school.
- (c) Time: time available to the students in each condition was relatively uniform across schools and uniform within schools. Most of the schools included in the sample had 40-minute periods; variation was upward and ranged from 3 to 10 minutes. Both the conventional and programed classes within schools participated in instruction during the same time period.
- (d) Content of the lessons: words, word elements, and other "content" aspects of the conventional and programed instructional conditions were the same for each lesson and for the total period of instruction. Deviations from the suggested methods in the lesson guide, however, were allowed and even encouraged.
- (e) Procedures: the programed lessons were standardized during the field trials with the program and were uniformly observed during the use of the program in the experimental year of the research.

Moving on to the technique of analysis, the analysis of variance utilized was a relatively large four-factor design.

Groups of individuals were used as the unit of analysis. The variables were dichotomized at the median separately for each school. Although the two classes for any given school were matched on any given variable (with some exceptions as noted in Appendix A) within that school, the medians varied between schools. That is, a given personality score or intelligence test score could be classified as high or low depending upon which school the student receiving such a score was in.

The use of group means rather than individual scores as the unit of analysis and the use of separate school cut-off scores on the personality and intelligence test variables both had the effect of reducing the power of the experimental design. (These procedures were judged to be defensible, however.)

In any event, a lack of power was not the problem. Had we found the degree of interactions we were seeking and had the statistical test then not been powerful enough to reject the null hypothesis, this reduction in power would have been more crucial. The fact is that few trends toward interaction were noted in our data.

It is probably (but by no means assuredly) true that by analyzing each instructional treatment internally and manipulating certain internal components to an exaggerated degree one might find interactions with personality characteristics of learners. Although such interactions might be of interest, they are beyond the concerns of the investigators in the present study. Nevertheless, we would be remiss in not suggesting this possibility in the service of the rationales which generated our inquiry.

There remains some consideration of the secondary questions raised: the interaction between intelligence and type of learning task structure, the interaction between sex and type of learning task structure, and the main effects of the selected personality variables. In no instance did sex interact significantly with instructional mode. A similar statement applies to the interactions between intelligence and instructional mode. None was significant.

Turning to main effects it should be noted, in passing, that subjects in the conventional instructional treatment scored significantly higher than subjects in the programmed instructional treatment on the recall, hypothesis making and total criterion dependent variables, but not on transfer. The fact that students in the programmed condition spent less time



working on the vocabulary lessons than the students in the conventional condition might help to account for this result. The excellence of the teachers, or lesson plans, or both, might also be responsible for this superiority of the conventional instructional group.

None of the main effects for compulsivity, neither constructive nor unconstructive, or exhibitionism was significant. Six main effects of the creativity variables were significant: imagination and total-creativity-minus-convergent-thinking on the transfer criterion; and imagination, flexibility, originality, and total creativity on the hypothesis making criterion. Nine main effects of the anxiety variables were significant: generalized school anxiety on the transfer criterion; general classroom anxiety on recall, transfer, and total criterion; parental pressure for achievement on hypothesis making and total criterion; test anxiety on the transfer criterion; and total anxiety on transfer and total criterion.

Although the significant main effects of the creativity variables were small (less than one point mean difference in all cases) they were in the expected direction and on the expected criterion measures. That is, students who were above the median on the subtests imagination, flexibility, originality, and total creativity scored higher on the hypothesis making criterion (which was viewed as containing a verbal fluency component) than students who were below the median on those subtests. The other two main effects of creativity were on the other criterion one might expect, transfer. Students above the median on imagination scored higher on the transfer criterion than did students below the median on imagination. Interestingly, students below the median on total-creativity-minus-convergent-thinking scored higher on the transfer criterion than did students above the median.

Of the nine significant main effects for anxiety, high anxiety was associated with lower criterion scores in all instances. These findings are generally consistent with a host of previous research studies on the relationship between anxiety and achievement.

Despite the fairly disappointing results, we would hesitate to rule out the interaction of mode of instruction and learner characteristics as a component of any general formulation of classroom learning. It is quite possible that our initial rationale is, in retrospect, rather naive. It may be that the interrelationships between the personality characteristics we have selected and the modes of instruction employed are far less simple than we thought.



## SECTION 5

### SUMMARY

The investigation reported in this document represented an exploration of the validity of the generalization that different teaching strategies are best for different students depending upon their personality. Arguments were offered for differentiating between two kinds of learning task structures, programed and conventional. The general research question we posed was: What relationship, if any, exists between selected personality characteristics of students and the relative degrees of success they have in learning from programed instructional materials and from conventionally structured learning tasks?

A thorough review of the literature led us to select four personality characteristics of learners which might be differentially related to success in learning from programed materials and from more conventionally structured learning tasks: anxiety, compulsivity, convergent-divergent thinking, and exhibitionism. These characteristics were not intended to exhaust those aspects of personality which might be related to degrees of success in the two different learning task structures nor were they conceived of as being unidimensional. However, within the range definitions of these variables, rationales were offered for their differential relationship to the two different learning task structures leading to the following specific research questions:

1. To what extent is there an interaction between compulsiveness and learning task structure (programed, conventional) and is this interaction statistically significant? (It was expected that learners scoring high on compulsiveness would do relatively better in the programed learning task situation.)
2. To what extent is there an interaction between the convergent-divergent thinking characteristics of a learner and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It was expected that learners scoring high on convergent thinking compared to divergent thinking would do relatively better in the programed learning task situation.)

3. To what extent is there an interaction between exhibitionism and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It was expected that learners scoring low on exhibitionism would do relatively better in the programed learning task situation.)
4. To what extent is there an interaction between anxiety and type of learning task structure (programed, conventional) and is this interaction statistically significant? (It was expected that learners scoring high on anxiety would do relatively better in the programed learning task situation.)

In addition to these specific questions, our design and analysis made it possible to secure evidence regarding such secondary questions as:

5. To what extent is there an interaction between intelligence and type of learning task structure (programed, conventional) and is this interaction statistically significant?
6. To what extent is there an interaction between sex and type of learning task structure (programed, conventional) and is this interaction statistically significant?
7. To what extent is there a difference between learners who are high and those who are low on selected personality aspects in their performance on the criterion measures and are these differences statistically significant?

From subsequent developmental work on the four personality characteristics selected, as reported in Section 2 and in the various appendixes, the following specific personality variables emerged: anxiety (general emotionality, generalized school anxiety, general classroom anxiety, peer anxiety, parental pressure for achievement, teacher anxiety, test anxiety); compulsivity (constructive and unconstructive compulsivity); creativity (imagination, flexibility, fluency, originality, total-creativity-minus-convergent-thinking); and exhibitionism. In addition to the personality variables and instructional treatment, sex and intelligence constituted the independent variables of the investigation. The dependent variables consisted of three scores representing types of achievement presumably attained in each instructional condition. The three achievement test

scores, recall, transfer, and generation of hypotheses, were combined to yield a total criterion or achievement test score.

The investigation was carried out over a two year period, 1964-1965 and 1965-1966. Approximately 5,000 eighth grade students from junior high schools in New York, New Jersey, and Pennsylvania participated in 1964-1965, the pilot year. This year was spent in refining the data gathering instruments, instructional materials, and other research procedures.

During the experimental year, 1965-1966, two eighth-grade English classes roughly equivalent in intelligence and sex distribution were identified in each of 22 junior high schools. One class in each school was randomly assigned to a programmed instructional condition, the other to a conventional instructional condition. About 600 subjects participated in each instructional condition. Subjects in the programmed condition received ten periods of instruction in programmed vocabulary by means of word analysis techniques, which included the teaching of meanings of word elements, affixes, and use of content. Subjects in the conventional condition received instruction in the same content by means of a set of 10 lesson plans and supplementary materials.

For purposes of analyses, subjects in each school were placed into one of 16 subgroups, based on dichotomization of the independent variables: sex, intelligence (high, low), level on the personality variable under consideration (high, low), and treatment condition (programmed, conventional). The dependent variables were the mean scores on the four vocabulary criterion tests of all the students from the same school in the same subgroup. Schools served as replicates to the basic design. Four-way factorial analyses of variance were carried out for all personality variable and criterion test combinations. The main effects of sex, intelligence, treatment condition, and each of the several personality variables as well as all interactions were calculated and tested for significance. The tests of significance for the interaction of each personality variable and treatment condition on each of the four dependent variables constituted the appropriate analyses addressing the major research questions raised by this study.

In all cases there was a failure to reject the null hypothesis stating that there were no interactions between personality and instructional condition (programmed, conventional) on the dependent variables (criterion measures). These results were discussed in terms of the data gathering instruments, the research design (including instructional treatment conditions), and the analysis



technique. Despite some possibilities of lowered sensitivity with respect to each of these factors in the study, it was concluded that there was no major reason to suggest that the results of the study would have been otherwise, given our research conditions. It was further indicated that our data were specific to the procedures, materials, and measures employed and that systematic variations of some of these specific factors might yield both significant and practical interactions. While maintaining a doubtful posture based on our results, we encourage such attempts.

With regard to the secondary questions raised by this investigation, in no instance did either sex or intelligence interact significantly with instructional mode. In all instances the significant main effect for mental age was attributable to the higher score on the dependent variables for those subjects high on mental age as compared with those who were low. Again, in all instances where instructional condition had a significant main effect, it was attributable to the higher score on the dependent variables for the subjects in the conventional as opposed to the programmed instructional treatment. The nine significant main effects for anxiety and the six for creativity were interpreted as consistent with expectancy and/or previous research studies. In all instances high anxiety was associated with lower criterion scores. In all instances, but one, students who were above the median on the creativity measures scored higher on the criterion measures on which significant differences were found. In the one exception, students below the median on total-creativity-minus-convergent-thinking scored higher on the transfer criterion than did students above the median.

Despite the nonsignificant results we would hesitate to rule out the interaction of mode of instruction and learner characteristics as a component of any general formulation of classroom learning. It would appear that the interrelationships between the personality variables we have identified and the modes of instruction employed are far less simple than we thought.



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## APPENDIX A

### ADDITIONAL DATA DESCRIBING CHARACTERISTICS OF THE PILOT AND EXPERIMENTAL YEAR SUBJECTS

This appendix is intended as a supplement to the information given on the selection of the experimental year sample in Section 2 of the text. The data presented include the number of subjects and classes in the participating schools during the pilot year of the investigation, and a more detailed breakdown of the characteristics of the experimental year subjects. The information presented includes a tabular presentation of the *N*s, mean mental age scores, and sex distribution for the individual treatment classes within schools for the experimental year. The 22 pairs of experimental year classes are further described with respect to school enrollment and census figures for the town or city in which the school is located.

#### Initial Sample Selection: The Pilot Year of the Research

Table 26 shows the number of eighth grade English classes and students within classes in the 23 schools during the pilot year (1964-65) of the investigation. Schools were selected early in the 1964-65 school year. Meetings were held by the investigators with school administrators and selected eighth grade teachers, and the nature and objectives of the research were explained. The cooperation and commitment of the school administrators and participating teachers were secured for the two-year period of the investigation.

During the pilot year of the investigation, classes in the pilot sample (as many as were available in each school) participated in one or more research efforts involving the development of the instruments and instructional materials used in the research. The last column in Table 26 indicates the schools that provided subjects for the experimental year which was completed during the 1965-66 school year. The one school not included during the experimental year had classes too small for the purposes of the research.



Table 26<sup>1</sup>

Number of Students and Classes in the School Sample  
During the Pilot Year of the Research<sup>2</sup>

School Code	Number of Classes	Number of Students	Length Class Period (Minutes)	Participation in Experimental Year
01	12	339	50	Yes
02	4	101	50	Yes
03	4	115	50	Yes
04	8	240	45	Yes
05	6	223	42	Yes
06	5	171	41	Yes
07	5	131	45	Yes
08	3	92	45	Yes
09	3	89	50	Yes
10	6	150	42	Yes
11	2	60	42	No <sup>a</sup>
12	13	300	50	Yes
13	3	72	41	Yes
14	6	168	45	Yes
15	6	154	40	Yes
16	6	201	40	Yes
17	4	120	45	Yes
18	3	90	45	Yes
19	2	57	46--50	Yes
20	2	60	45	Yes
21	6	180	45	Yes
22	5	150	50	Yes
23	4	120	40	Yes

<sup>1</sup>Table 25 was deleted.

<sup>2</sup>Classes in the pilot school sample were involved in validation of the IRV program and/or in the development of the personality and criterion measures.

<sup>a</sup>School 11 did not participate in the experimental phase of the investigation due to insufficient number of students in classes.

#### Characteristics of the Experimental Year Sample

The remaining three tables in this appendix present data describing characteristics of the experimental year sample

relevant to the investigation. Table 27 shows the mean mental age scores, and tests of significance of the mean differences, for each of the programmed and conventional classes within the 22 schools. Table 28 presents the corresponding data for the sex distribution of these classes. Table 29 shows, for each given school, the fall, 1963, student enrollment in the eighth grade, the total enrollment in the school system, and the 1960 census figures for the town or city in which the school is located.

The data given in Tables 27 and 28 are relevant to judging the degree of success obtained in meeting the matching requirements described for the experimental year sample in Section 2 of the text. The tests of significance for the mean mental age differences between classes -- within schools, shown in Table 27, indicate that matching on this variable was not entirely successful. The mean difference for four of the pairs of classes was significant ( $p < .05$ ). Significance tests were not carried out for differences in the distribution of the sexes between the 22 pairs of treatment classes. However, the data presented in Table 28 show that in many cases, a rough match was not obtained (see for example, the figures given for the classes in schools 03, 07, 09, 13, 15, and 18).

Table 27

Significance of the Differences Between the Mental Age Means  
of the Programed and Conventional Classes within Schools<sup>1</sup>:  
Experimental Year Sample

Programed Classes			Conventional Classes			Mean Differ- ence	Signifi- cance Level <sup>b</sup>
Class Code <sup>a</sup>	N	Mean	Class Code <sup>a</sup>	N	Mean		
011	23	52.48	012	26	51.85	.63	N.S.
021	21	57.24	022	18	52.72	4.52	N.S.
031	20	53.35	032	23	55.22	1.87	N.S.
041	28	70.68	042	23	74.87	4.19	N.S.
051	28	52.75	052	25	58.12	5.37	P < .05
061	25	57.92	062	28	55.75	2.17	N.S.
071	22	67.64	072	24	63.04	4.59	N.S.
081	12	52.92	082	13	50.31	2.61	N.S.
091	27	51.07	092	29	49.38	1.69	N.S.
101	24	64.29	102	19	63.78	.50	N.S.
121	28	66.25	122	25	67.84	1.59	N.S.
131	29	55.76	132	25	58.32	2.56	N.S.
141	30	56.90	142	19	54.26	2.64	N.S.
151	21	54.81	152	24	53.92	.89	N.S.
161	17	57.47	162	22	57.50	.03	N.S.
171	30	54.03	172	33	57.97	3.94	N.S.
181	22	62.73	182	23	56.87	5.86	P < .05
191	19	48.00	192	29	56.66	8.66	P < .05
201	27	57.67	202	25	64.68	7.01	P < .05
211	18	52.44	212	21	48.67	3.78	N.S.
221	24	58.04	222	24	55.83	2.21	N.S.
231	18	62.89	232	28	64.54	1.65	N.S.
Totals		513	57.84	527		58.01	
Combined Groups: N = 1040; Mean = 57.93							

<sup>1</sup>Mental age scores are raw scores from the Lorge-Thorndike Verbal IQ, Level IV, Form A.

<sup>a</sup>The first two digits indicate school identification number. The third digit indicates the treatment group (1 = programed, 2 = conventional).

<sup>b</sup>A program available at the Cornell Computing Center was used to calculate the mean differences and significance levels. The result of this procedure is a least significant difference ( $p < .05$ ) for all possible pairs of means. The procedure for each pair of means is equivalent to a t test for a mean difference.

Table 28  
Sex Distribution of Pupils  
in the Programed and Conventional Conditions:  
Experimental Year Sample

Programed Classes				Conventional Classes			
Class Code <sup>a</sup>	Girls	Boys	Total	Class Code <sup>a</sup>	Girls	Boys	Total
011	14	9	23	012	14	12	26
021	11	10	21	022	11	7	18
031	11	9	20	032	16	7	23
041	12	16	28	042	15	8	23
051	16	12	28	052	13	12	25
061	14	11	25	062	16	12	28
071	10	12	22	072	7	17	24
081	6	6	12	082	5	8	13
091	12	15	27	092	18	11	29
101	7	17	24	102	6	13	19
121	14	14	28	122	11	14	25
131	21	8	29	132	13	12	25
141	14	16	30	142	12	7	19
151	9	12	21	152	15	9	24
161	9	8	17	162	12	10	22
171	12	18	30	172	14	19	33
181	18	4	22	182	10	13	23
191	11	8	19	192	17	12	29
201	13	14	27	202	15	10	25
211	8	10	18	212	12	9	21
221	13	11	24	222	14	10	24
231	10	8	18	232	11	17	28
Totals	542	497	All: 1039 <sup>b</sup>				

<sup>a</sup>The first two digits indicate school identification number. The third digit indicates the treatment group (1 = programed, 2 = conventional).

<sup>b</sup>Total is discrepant from that given in Table 27 due to the fact that one subject failed to be classified on the sex variable.



Table 29

Schools Which Participated in the Experimental Year  
of the Research: Eight Grade Enrollment, Total School Enrollment<sup>1</sup>  
and Population of the Town or City in Which the School is Located<sup>1</sup>

School Code	8th Grade Enrollment	Total Enrollment <sup>a</sup>	Town or City Population <sup>d</sup>
01	439	2,667 <sup>b</sup>	< 2,500
02 & 03	976	13,088	75,941
04	233	2,990	6,791
05 & 06	441	6,452	17,704
07	168	576 <sup>c</sup>	26,057
08	142	1,651	< 2,500
09	84	1,141	< 2,500
10	174	2,339	6,166
11	79	1,154	< 2,500
12	372	5,512	65,128
13	127	1,725	< 2,500
14	217	3,045	< 2,500
15 & 16	584	8,973 <sup>c</sup>	8,397
17	195	615 <sup>c</sup>	7,917
18	154	2,120	7,439
19	348	4,916	24,960
20	152	2,254	5,098
21	134	1,927	2,813
22	158	2,420	5,950
23	136	1,882	< 2,500

<sup>1</sup>Enrollment data is for Fall, 1963, and was obtained from Annual Educational Summary Nineteen Sixty Three-Sixty Four, The University of the State of New York, The State Department, Bureau of Statistical Services, 1965.

<sup>a</sup>Total school enrollment includes grades K-12, except for the 3 schools noted in footnotes (b) and (c).

<sup>b</sup>Total school enrollment includes grades 7-12.

<sup>c</sup>Total school enrollment includes grades 7-9. These figures were obtained from school officials (1965-1966).

<sup>d</sup>Town and city population represents the 1960 census data taken from the World Almanac and Book of Facts, 1966, edited by Luman H. Long and published annually by the New York World Telegram and Sun. The exact population for communities of less than 2,500 is not indicated. The reader will note that in many cases the school enrollment approaches or exceeds the town population. This reflects rural communities which have a central school system drawing a large percentage of the students from outside the town boundaries.

## APPENDIX B

### DEVELOPMENT OF THE COMPULSIVITY SCALE

There were three major stages in the construction of the instrument which purports to measure compulsivity. The first stage involved: (a) reviewing the literature with the intent of developing a workable definition of the general construct of compulsivity; (b) refining this definition into more specific subdivisions of the construct; and (c) selecting or constructing items for the measurement of the more specific subdivisions. The second stage also consisted of three tasks involving: (a) administering the original pool of items to 200 to 300 eighth graders; (b) dividing the items into a priori subdivisions for factor analyses; and (c) eliminating items on the basis of these analyses. In the final stage, the test was reduced to the 20-minute instrument used in the experimental phase of the research. The second stage item pool was administered to a new sample of 200 to 300 eighth graders. The item subdivisions were combined for two large factor analyses, and the results were used in further eliminating items from the various subdivisions. The details of the three stages of test construction are described below.

#### Stage One

Grimes and Allinsmith (24) present an excellent review of definitions of compulsivity. The major elements of these definitions, with the names of the contributing authors indicated, are summarized in Table 30.

In four research reports, Comrey (8) (9) and (10), and Comrey and Schlesinger (11) have described the development of several self-report measures designed to measure compulsivity in adults. A summary of the "factored homogeneous item dimensions" obtained in these studies is shown in Table 31.

Other personality dimensions of the general construct of compulsivity considered were rigidity (Baer (2)), conscious perseveration (Weisgerber, (70), (71), (72)) and the second order factors of conjunctivity-disjunctivity, change-sameness, impulsiveness-deliberation, and order-disorder, included in Stern's College Activities Index (59).

Table 30

Summary of Major Literary Definitions of Compulsivity<sup>1</sup>

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COMPULSIVITY

Fenichel -	<p>need for being systematic                      clinging to known routine and clear guide-rules                      tendency to classify ideas rigidly in logical categories                      thinking in black and white terms                      meticulous preoccupation with small, insignificant details                      frequent inability to see the forest for the trees</p>
Murphy -	<p>"Everything that is free, uncontrolled, spontaneous is dangerous"                      Papa will spank                      play safe                      put the books back in the right place                      rule the note-paper neatly                      pay your bills on the first of the month                      be good</p>
Frenkel-Brunswik -	<p>"In order to reduce conflict and anxiety and to maintain stereotyped patterns, certain aspects of experience have to be kept out of awareness. . . . The clinging to the familiar and precise detail can go hand in hand with the ignoring of most of the remaining aspects of the stimulus configuration, resulting in an altogether haphazard approach to reality."</p> <p>extreme intolerance of ambiguity                      accepting superficial clarity at a cost of maladaptive behavior</p>
<u>SUMMARY</u>	<p>exaggerated conceptions about exactness and order and oriented motivationally and perceptually by these concerns                      rigid                      preoccupied with small details                      inhibited in spontaneity                      conforming                      perfectionistic                      seeking certainty                      intolerant of ambiguity or incongruity</p>

---

<sup>1</sup>From: Jesse W. Grimes and Wesley Allinsmith, "Compulsivity, Anxiety, and School Achievement," Merrill-Palmer Quarterly, Vol. 7 (October, 1961), pp. 247-271.

Table 31  
Make-up of Compulsiveness as Determined  
by Four Personality Scale Studies of A. L. Comrey

Factored Homogeneous Item Dimensions	Factor Loadings			
	Sample 1 <sup>a</sup> (N = 436)	Sample 2 <sup>b</sup> (N = 506)	Sample 3 <sup>c</sup> (N = 286)	Sample 4 <sup>d</sup> (N = 305)
Need to Excel	.40			
Welfare of Loved Ones	.38	.45		
Rhathymia	-.33	-.34		
Drive to Finish	.63	.63	.63	.61
Need for Security	.39			
Need for Order	.59	.68	.78	.72
Personal Grooming		.53	.60	.35
Cautiousness		.51	.36	.53
Impulsiveness		-.31		-.37
Need for Approval		.39		
Social Desirability		.38		
Self Control		.34		
Love of Routine				.62
Meticulousness				.55

<sup>a</sup>Comrey (8).

<sup>b</sup>Comrey and Schlesinger (11).

<sup>c</sup>Comrey (9).

<sup>d</sup>Comrey (10).

Consideration of the various personality dimensions alluded to above, resulted in an initial definition of compulsivity which comprised ten a priori categories. The category labels, together with short descriptive phrases for each, are given in Table 32. The definitions of the categories or dimensions of compulsivity, and the procedures then used in constructing the subtests, proceeded without consideration of any possible relationship to factors involved in learning or achievement. In other words, the definitions of the compulsivity dimensions and the items selected for measuring them were arrived at without consideration of whether they would differentiate on academic performance.

A pool of items was then constructed around the descriptions of the ten a priori dimensions of compulsivity shown in



Table 32

A Priori Breakdown of Compulsivity Into Categories

---

1. INTOLERANCE OF AMBIGUITY - NEED FOR ORDER
  - clinging to known routine
  - desire for clear guide-lines
  - need for order
  - uneasiness with freedom
  - dislike of incongruity
  - certainty - seeking
  - inhibited spontaneity
  - thinking in black and white
2. RIGIDITY
  - thinking in black and white
  - tendency to classify ideas rigidly in logical categories
  - being good
  - maintenance of stereotyped patterns
  - ignoring aspects of stimulus which don't agree with one's own "reality"
  - superficial clarity
  - (promptness)
3. CAUTIOUSNESS
  - play it safe
  - conform
  - avoid taking risks
  - better slow and sure
4. LOVE OF ROUTINE
  - maintain regular schedule
  - plan activities
  - need for being systematic
  - dislike of change
5. METICULOUSNESS
  - avoid messy things
  - preoccupation with small details
  - do things neatly
  - perfectionistic
  - personal grooming

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(Continued on next page)

Table 32  
(Continued from Previous Page)

- 
- |      |                                  |   |
|------|----------------------------------|---|
| 6.   | DRIVE TO FINISH                  | matter of conscience                              |
|      |                                  | concentration                                     |
|      |                                  | bothered by incompleteness                        |
|      |                                  | persistence                                       |
| <br> |                                  |   |
| 7.   | UNREASONABLE REPETITIVE BEHAVIOR | tapping foot                                      |
|      |                                  | humming melody                                    |
|      |                                  | hitting every other fence post                    |
| <br> |                                  |   |
| 8.   | PARALYZED INITIATIVE             | getting stalled when things don't work            |
|      |                                  | making decisions                                  |
|      |                                  | self conscious                                    |
|      |                                  | getting started -- especially in unstructured job |
| <br> |                                  |   |
| 9.   | REPETITIVENESS                   | eating  |
|      |                                  | saving things                                     |
|      |                                  | careful of possessions                            |
| <br> |                                  |   |
| 10.  | HUNCHES                          | happiness   |
|      |                                  | never scratched head                              |
|      |                                  | keep elbows in                                    |
|      |                                  | uneasiness with potent smells                     |
- 

Table 32. This involved writing new items and the selection and/or revision of items in existing inventories. Four formats were selected for writing items. These were: (a) items requiring a "yes" or "no" response; (b) pairs of items of the forced-choice type; (c) items consisting of pairs of words requiring a forced choice; and (d) items consisting of statements presented in a Q-sort format which required subjects to sort statements into five piles from most agree to most disagree. A fifth test, "pencil problems", involved completing simple graphic tasks (e.g., filling in a circle), which presumably would differentiate the compulsive individual from the noncompulsive.

In writing items for the test formats and the dimensions of compulsivity, attempts were made to insure readability for eighth graders, and to minimize the operation of the factors of social desirability and other response sets. These attempts included "reversing" items so that approximately half reflected the positive aspects of a given personality dimension and the other half reflected the negative aspects. The possible influence of the social desirability factor was minimized in the wording of the items. Items representative of the ten a priori dimensions of compulsivity were distributed over the four item formats and the types of tasks required in the pencil problems test. The resultant distribution of the four item types or formats, within each of the personality dimensions, is shown in Table 33.

Table 33  
Distribution of Item Forms Within  
the Ten A Priori Dimensions of Compulsivity

<u>Compulsivity Dimension</u>	<u>Yes--No</u>		<u>Item Form</u>		<u>Q<sup>a</sup> Sort</u>	<u>Pencil Problems</u>	<u>Total</u>
			<u>Forced Choice</u>	<u>Word Choices</u>			
Intolerance							
of Ambiguity	7 --	3	4	7	1	2	24
Rigidity	10 --	9	5	3	2	-	29
Cautiousness	3 --	8	1	8	3	-	23
Love of Routine	7 --	5	5	8	3	-	28
Meticulousness	5 --	5	17	6	5	7	45
Drive to Finish	5 --	4	3	4	3	1	20
Unreasonable							
Repetitive							
Behavior	5 --	1	-	-	-	1	7
Paralyzed							
Initiative	8 --	5	2	5	-	-	20
Retentiveness	4 --	5	1	2	1	-	13
Hunches	12 --	9	2	7	2	-	32
TOTALS	66 --	54	40	50	20	11	241

<sup>a</sup>Fifteen "neutral" items, not shown in the figures given for this format, were also included.

## Stage Two

The 241 items comprising the first form of the compulsivity scale were group-administered to 349 eighth graders in 13 classrooms in three of the pilot schools. Of the total subject pool, 291 students completed all parts of the instrument successfully.

Nine of the a priori item dimensions were subjected to separate principal components analyses. The analyses were in the nature of hypotheses testing. If the item category were "in reality" an independent and relatively pure or simple dimension, and the items constructed were representative of it, then the first (general) principal component would account for a large portion of the total item variance. Given this result, it would then be relatively simple to select the best items representative of the dimension on the basis of the dual criterion of high item factor loadings and logical relationship of the items to the supposed factor. Table 34 shows the per cents of variance accounted for by the first principal component in each analysis for a given compulsivity dimension. Several of the nine a priori groupings did have more than one important and logical dimension. The items representing these were retained. Items with low variance and not loading highly on any important and logical factor were eliminated. The number of items retained for the next administration of the scale was 156.

Table 34

Per Cents of Variance Accounted for  
by the First Principal Component for Each Compulsivity Subtest  
(N = 291)

<u>Dimension<sup>a</sup></u>	<u>Per Cent Variance</u>
1. Meticulousness	13
2. Retentiveness	46
3. Paralyzed Initiative	25
4. Drive to Finish	22
5. Rigidity	14
6. Repetitive Behavior	31
7. Intolerance of Ambiguity	19
8. Cautiousness	23
9. Love of Routine	36

<sup>a</sup>The tenth category, "hunches," was a conglomerate of items left after items had been placed in the other nine. This category was dropped from consideration at this point.



### Stage Three

Concurrent with the analyses for stage three, it was conjectured that the dimension, intolerance of ambiguity, was not a factor distinct from all the rest. Rather, it was supposed that intolerance of ambiguity was a central dimension, with the other factors conceived as ways of responding to this dimension. It was further hypothesized that these responses to ambiguous situations could be either: (a) constructive, characterized by meticulousness, drive to finish, and love of routine; or (b) unconstructive, characterized by cautiousness, rigidity, and paralyzed initiative.

The 156 items retained from stage two were administered to 246 new subjects in three schools. The items were then divided into two groups on a logical basis (items from most dissimilar dimensions put together) and each group was subjected to a principal component analysis and varimax rotation, with the number of factors being the same as the number of latent roots greater than unity (Kaiser, (34)). This procedure resulted in 57 small (one to eight items) specific factors. Again items with low variance were eliminated. Factors (with associated items) were eliminated on the basis of logical interpretation of content, with due regard for the possibilities of instrument factors, variance factors, and other uninterpretable phenomena (Catell (6a)). Forty-six of the 57 factors were interpretable, although some were specific to a single item.

The two varimax factor correlation matrices from the principal components analyses were in turn subjected to separate analysis to obtain what was hoped would be the conjectured nine categories as second order factors. Based on a principal components analysis with rotation as suggested by Kaiser (34) second order factors were obtained which modified the interpretation of intolerance of ambiguity from one dimension into the dimensions of intolerance of indefiniteness and intolerance of incompleteness. Love of routine was subsumed under meticulousness. Clear factors of repetitive behavior, retentiveness, and rigidity failed to materialize. Items purporting to measure these were distributed in cautiousness and paralyzed initiative.

Seven factors were clearly interpretable. These were meticulousness, tendency to finish, intolerance of indefiniteness, cautiousness, uncomfortableness in social relationships, intolerance of incompleteness, and paralyzed initiative. The (first order) factors with highest loadings were chosen to represent the more general (second order) factors. Although

the nature of the categories changed somewhat from that which had originally been conceived the two more general dimensions of constructive and unconstructive compulsivity remained. The total of 62 items (seven subtests) associated with these two dimensions are shown in Table 35. This list comprises the final form of the compulsivity scale administered during the experimental year of the research.

Table 35  
Varimax Factor Loadings of the Compulsivity Subtests:  
Pilot Sample<sup>1</sup>  
(N = 246)

<u>Subtests</u>		<u>Factors</u>		<u>Communalities</u>
		<u>1</u>	<u>2</u>	
1.	Meticulousness	.88 <sup>c</sup>	-.03	.77
2.	Tendency to finish	.76 <sup>c</sup>	-.27	.65
3.	Intolerance of Indefiniteness	.04	.52 <sup>u</sup>	.27
4.	Cautiousness	.74 <sup>c</sup>	.22	.60
5.	Uncomfortableness in Social Relationships	.23	.55 <sup>u</sup>	.35
6.	Intolerance of Incompleteness	.60 <sup>c</sup>	.17	.39
7.	Paralyzed Initiative	-.20	.74 <sup>u</sup>	.59
<u>Per cent of Variance</u>		33.6	18.1	51.7

<sup>1</sup>Two principal components extracted and rotated.

<sup>c</sup>Constructive compulsivity subtests.

<sup>u</sup>Unconstructive compulsivity subtests.

#### Construct Validity of the Compulsivity Scale: Further Analysis

Additional analyses of the compulsivity scale dimensions were accomplished to determine if the seven empirically and logically derived factors were indeed distributed in the hypothesized more general factors -- constructive and unconstructive compulsivity. If this proved to be the case, a composite of scores on the seven compulsivity dimensions would not be particularly

meaningful since constructiveness and unconstructiveness would presumably be differentially related to school achievement.

Two subject samples were used for the analyses. One sample consisted of the 246 students who were administered the 156-item compulsivity scale at stage three of the test construction procedure. The second sample consisted of 1003 subjects who completed all parts of the final 62-item compulsivity scale used in the experimental phase of the investigation. Student responses were scored for the seven dimensions of compulsivity (the 62 item test) retained from stage three: meticulousness, tendency to finish, intolerance of indefiniteness, cautiousness, uncomfortableness in social relations, intolerance of incompleteness, and paralyzed initiative (see Table 35). The scores for the compulsivity subtests for the two samples were subjected to separate principal components analyses with varimax rotations. In each case, two principal components were extracted and rotated.

The rotated factor loadings of the seven subtests are shown for the second pilot and the experimental year samples, respectively, in Tables 35 and 36. Supporting data, means standard deviations, and intercorrelations of the subtests scores, are shown in Tables 37 through 39.

Table 36  
Varimax Factor Loadings of the Compulsivity Subtests:  
Experimental Year<sup>1</sup> Sample  
(N = 1003)

Subtests	Factors		Communalities
	<u>1</u>	<u>2</u>	
1. Meticulousness	.80 <sup>c</sup>	.01	.63
2. Tendency to Finish	.77 <sup>c</sup>	.19	.63
3. Intolerance of Indefiniteness	.00	-.64 <sup>u</sup>	.41
4. Cautiousness	.71 <sup>c</sup>	-.21	.54
5. Uncomfortableness in Social Relationships	.12	-.69 <sup>u</sup>	.50
6. Intolerance of Incompleteness	.65 <sup>c</sup>	.06	.43
7. Paralyzed Initiative	-.20	-.69 <sup>u</sup>	.52
<u>Per cent of Variance</u>	31.6	20.7	52.3

<sup>1</sup>Two principal components extracted and rotated.

<sup>c</sup>Constructive compulsivity subtests.

<sup>u</sup>Unconstructive compulsivity subtests.

Table 37  
Intercorrelations of the Compulsivity Subtests:  
Pilot Sample  
(N = 246)

	<u>Subtests</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1.	Meticulousness <sup>c</sup>	---	.58	.01	.55	.12	.48	-.13
2.	Tendency to Finish <sup>c</sup>		---	-.04	.41	.13	.20	-.28
3.	Intolerance of Indefiniteness <sup>u</sup>			---	.07	.11	.05	.06
4.	Cautiousness <sup>c</sup>				---	.17	.31	.04
5.	Uncomfortableness in Social Relationships <sup>u</sup>					---	.05	.12
6.	Intolerance of Incompleteness <sup>c</sup>						---	.01
7.	Paralyzed Initiative <sup>u</sup>							---

<sup>c</sup>Constructive compulsivity subtests.

<sup>u</sup>Unconstructive compulsivity subtests.

Table 38  
Intercorrelations of the Compulsivity Subtests:  
Experimental Year Sample  
(N = 1003)

	<u>Subtests</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1.	Meticulousness <sup>c</sup>	---	.49	-.01	.44	.04	.38	-.12
2.	Tendency to Finish <sup>c</sup>		---	-.06	.38	.01	.36	-.27
3.	Intolerance of Indefiniteness <sup>u</sup>			---	.03	.21	-.03	.19
4.	Cautiousness <sup>c</sup>				---	.11	.28	.04
5.	Uncomfortableness in Social Relationships <sup>u</sup>					---	.01	.22
6.	Intolerance of Incompleteness <sup>c</sup>						---	-.09
7.	Paralyzed Initiative <sup>u</sup>							---

<sup>c</sup>Constructive compulsivity subtests.

<sup>u</sup>Unconstructive compulsivity subtests.



Table 39  
Means and Standard Deviations  
of the Compulsivity Subtest Scores  
for the Pilot and Experimental Year Samples

<u>Subtests</u>	Pilot Sample <sup>a</sup>		Experimental Year Sample <sup>b</sup>	
	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
1. Meticulousness <sup>c</sup>	10.5	3.2	10.7	3.1
2. Tendency to Finish <sup>c</sup>	5.0	1.9	5.1	1.9
3. Intolerance of Indefiniteness <sup>u</sup>	3.2	1.3	3.2	1.2
4. Cautiousness <sup>c</sup>	4.4	2.0	4.9	1.8
5. Uncomfortableness in Social Relationships <sup>u</sup>	3.7	1.7	3.4	1.6
6. Intolerance of Incompleteness <sup>c</sup>	4.6	1.2	4.5	1.2
7. Paralyzed Initiative <sup>u</sup>	4.8	2.0	5.2	2.2

<sup>a</sup>N = 246.

<sup>b</sup>N = 1003.

<sup>c</sup>Constructive compulsivity subtests.

<sup>u</sup>Unconstructive compulsivity subtests.

Table 35 shows that the subtests meticulousness, tendency to finish, cautiousness, and intolerance of incompleteness, loaded substantially on the first rotated factor in the analysis for the pilot sample. Clearly, this supports the hypothesis that these four subtests would comprise a single more general factor. The label, "constructiveness" seems appropriate since the behavioral tendencies represented in these subtests would presumably have a positive effect on the student's performance in the academic achievement situation. Conversely, the subtests which loaded on the second factor were the hypothesized dimensions of unconstructive compulsivity: intolerance of indefiniteness, uncomfortableness in social relations, and paralyzed initiative.

The results of the factor analysis of the compulsivity subtests on the experimental year sample, shown in Table 36, were essentially the same as those obtained on the pilot year sample. That is, the four subtests hypothesized as composing

the dimension of constructive compulsivity loaded highly on the first factor, but had low loadings on the second factor. Conversely, the subtests for unconstructive compulsivity loaded highly on the second factor, but had low loadings on the first factor. Changes in the factor loadings and the subtest communalities from the first to the second analysis were generally quite small. The results of the second analysis, which may reasonably be considered an effort to cross validate the dimensions retained from the previous analysis, provide substantial support for the hypothesized dimensions of compulsivity.

Further evidence for the construct validity of the compulsivity scale is presented in Table 55, Appendix E. This table shows the correlations of the compulsivity subtests scores with the subtest scores for the anxiety scale. These data show that the compulsivity subtests scores were correlated significantly with several of the anxiety subtest scores (excepting parental pressure for achievement). The signs of the correlations of the compulsivity subtest scores with total anxiety indicate that the anxious student tended to be lower on meticulousness and drive to finish, but higher on intolerance of indefiniteness, cautiousness, uncomfortableness in social relations, and paralyzed initiative. With the exception of the relationship between anxiety and cautiousness, it appears that the anxious student tended to score higher on the subtests measuring the unconstructive aspects of compulsivity and lower on the constructive aspect. These results provide further support for the grouping of the compulsivity subtests into the two general dimensions of constructive and unconstructive, in that theory leads one to expect the anxious subject to employ more ineffective (or unconstructive) modes of defense under stress (Gaier (20), Singer and Row (58)).

Table 40  
Composition of Compulsivity Factors

I. Meticulousness

Would you rather . . . ?

1. -use a brand new book?  
-use a book with some answers written in it?
2. -do a job when you think of it?  
-write out a schedule for getting things done?
3. -cross out a mistake with one line?  
-cross out a mistake with many lines?

(Continued on next page)

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(Continued from Previous Page)

4. -be on time to a class?  
-stop to talk with a friend?

Word Choices

5. neat . . . . . casual  
6. regular. . . . . irregular  
7. orderly. . . . . easy-going  
8. impulse. . . . . decision  
9. expected. . . . . unexpected  
10. schedules. . . . . unplanned

Yes and No

11. I like having my hands greasy.  
12. Being neat is the most important thing, when you're working on something.  
13. I usually write out a schedule for getting things done.  
14. I'd like to play hooky sometimes.  
15. I usually do a job whenever I think of it, without actually planning it ahead of time.  
16. I like to keep my locker really neat.

II. Tendency to Finish

1. - do only the important parts?  
-completely finish a job even though it's unnecessary?  
2. promise . . . . . finish  
3. accomplish. . . . . excitement  
4. exact . . . . . missing  
5. I usually finish a thing even if I'm tired and bored with it.  
6. When I start a job I always finish it.  
7. If I have to leave something unfinished, it's okay with me.  
8. Once I've started a job, my conscience makes me keep going until it's done.

III. Intolerance of Indefiniteness

1. -have a definite job to do for a class project?  
-be in charge of getting things organized?  
2. I like modern art.  
3. I hate to be interrupted in the middle of doing an assignment.  
4. I don't want to work on a problem unless there is a definite "right or wrong" answer.

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- 
5. A thing is either right or wrong.
  6. I like comic strips that are complete each day better than serials.

IV. Cautiousness

1. -ride with a fast driver?  
-ride with a slow driver?
2. skill. . . . . luck
3. safe . . . . . gamble
4. method . . . . . chance
5. It is much better to play it safe.
6. I think I am stricter about right and wrong than most other kids.
7. I almost feel sick when I realize I've forgotten something.
8. I'm always willing to take a chance.

V. Uncomfortableness in Social Relations

1. sociable . . . . . quiet
2. It annoys me to listen to someone who can't make up his mind about what he really believes.
3. It's easy for me to talk to new people.
4. It makes me very uncomfortable when somebody does something which doesn't fit his personality.
5. It is easier to work with things than people.
6. I don't think people should borrow things.
7. People who seem unsure about things make me feel uncomfortable.
8. I think everybody should have his own things and avoid borrowing.

VI. Intolerance of Incompleteness

1. -correct only important mistakes?  
-correct every mistake no matter how small?
2. -finish the good book you're reading?  
-be interrupted for something pleasant?
3. -follow the rules exactly?  
-follow important parts of the rules?
4. -read a whole story?  
-read parts of a story?
5. time. . . . . space
6. If something doesn't seem to fit with the way you see a thing, you should ignore it.

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Table 40  
(Continued from Previous Page)

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VII. Paralyzed Initiative

1. Many times I just don't know what to do first.
2. Other people seem to have more fun than I do.
3. I often start things I never finish.
4. I prefer to do things the way most other people do.
5. I like to dress the way my friends do.
6. I can make quick decisions.
7. I often have a hard time making up my mind on simple things.
8. I get down in the dumps quite often.
9. It's hard for me to get started on a complicated job.
10. When something goes wrong with something I'm doing, I get "stalled."

VIII. Lie (Defensiveness Scale)

1. I am always happy.
  2. Sometimes I say things I shouldn't say.
  3. I sometimes lie.
  4. I sometimes get angry.
  5. I am always nice to other kids.
  6. Sometimes I don't do what I'm told to do.
  7. Sometimes I am unkind to other kids.
  8. I sometimes have bad manners.
-

## APPENDIX C

### DEVELOPMENT OF THE EXHIBITIONISM SCALE

This section of the report presents a brief summary of the procedures used in the development of the Exhibitionism Scale (ES), and the characteristics of this instrument as it was used in the experimental year of the research.

#### Conceptual Definition of Exhibitionism

The initial conceptualization of exhibitionism was based on the research of Levin and Baldwin (38) and Levin, Baldwin, Gallway, and Piavo (39), wherein exhibitionism is defined briefly as a tendency to approach situations involving public performance. Somewhat more broadly, one can conceive of various types of exhibitionism. That is, both the response and the eliciting stimuli may be invariant for a given individual, but could vary between individuals, depending upon prior history. It follows that the procedure for the development of the ES would parallel that used in constructing the School Anxiety Scale described in Appendix E. For the ES, this involved identifying types of exhibitionism followed by the construction of several subtests designed to measure the separate types. The construction of the exhibitionism subtests was guided by a broader literary definition derived from descriptions of a similar disposition in adults (Edwards (16), Knapp (35)), and an informal survey of junior high school teachers' descriptions of the exhibitionistic child.<sup>1</sup> The definition arrived at was also used in the study as a basis for teacher ratings of exhibitionism. Exhibitionistic children were those who could be described by one or more of the following statements:

enjoy being the center of attention in class.

are open in speaking about themselves or in expressing their emotions or feelings.

enjoy saying witty and clever things, telling jokes and stories or in other words gaining the center of attention in the classroom and in other group situations.

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<sup>1</sup>An assistant for the project obtained behavioral descriptions of the classroom exhibitionist from 18 junior high school teachers.

prefer and enjoy most types of group activities (e.g., class discussions, participating in school plays, school offices, etc.).

are energetic or vigorous in their approach to most life situations, particularly the social ones.

are impulsive (e.g., quick to express their opinions or feelings).

prefer not to work patiently and alone on some school task.

fond of attending parties and other social events and in such situations are likely to be the "life of the party."

are inclined to tell others of things they have done, products they have made and in other ways exhibit themselves in an audience situation.

#### Stage One: Construction of the Initial Form of the ES

The procedures used in constructing the ES parallel those used in developing the SAS, presented in Appendix E. Briefly this involved: (1) conceptualizing the a priori subdivisions of the construct; (2) constructing and/or selecting the items and test formats coordinated with the a priori subdivisions of the construct; and (3) administering the test to two successive samples of eighth graders with the intent of refining and reducing the size of the test. The goal, as with the SAS, was to arrive at several homogeneous groupings of items (subtests), each of which measured a relatively independent type or manifestation of exhibitionism. Data obtained from the two administrations of the ES (stages two and three) provided the basis for the successive reconstructions of the test. The specific procedures used in test reconstruction at these two stages have already been described in Appendix E.

Initially, 21 categories or a priori subdivisions were conceived for grouping items in the ES. Four test formats were selected and the subdivisions with associated items were distributed over the test formats. At this point the test required 210 responses and could be completed in approximately two 40-minute classroom periods. A description of the test formats with the number of items in each follows.

The What I Think Test-I (WIT-I) consisted of 100 statements describing opinions, feelings, or behavioral tendencies generally reflected in the school setting. The respondent was asked to judge whether he agreed with each statement and to respond by marking a "true" or "false". Statements indicative of exhibitionism were either "true's" or "false's," with "true" being the predominant appropriate response.

The Word Choices (WC) test contained 50 pairs of words that were opposite in meaning (e.g., reserved--talkative). The respondent was directed to select the word from each pair that appealed to him most, without undue reflection. One word in each pair was selected so as to be descriptive or representative of the exhibitionism characteristic. In constructing the non-exhibitionism alternative for each pair, an attempt was made to select words which would represent an equally desirable choice. Order of the exhibitionist choice in each pair was determined randomly.

The Personal Choice Survey (PCS) consisted of 40 pairs of items of the "forced-choice" type. The respondent was asked to select the alternative in each pair which best described how he thought or felt. For each pair of items, one alternative was scored for exhibitionism. In each case, an attempt was made to construct pairs of items which represented equally desirable choices. Order of the correct choice in each pair was determined randomly.

The What I Think-II test was a 35 item Q-sort consisting of 20 statements of opinions, feelings, or behaviors indicative of exhibitionism, and 15 "filler" or neutral statements. The respondent was instructed to arrange the statements into five piles (with seven cards in each pile) on the basis of extent of agreement with item content. Items at one extreme (pile A) contained the statements with which the respondent agreed most. Successive piles (B, C, D, E) indicated decreasing degrees of agreement.

## Stage Two

Following the construction of Form 1 of the ES, it was administered to approximately 300 eighth graders during two classroom periods. Twelve of the 21 a priori item subdivisions were then factor analyzed separately and the test reconstructed on the basis of the procedure described in Appendix E.<sup>1</sup> Seven

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<sup>1</sup>Due to time limitations, factor analyses were accomplished only for the 12 most important item subdivisions. The same limitation was imposed on the SAS where 15 of the original 31 item subdivisions were factor analyzed at stage two.



factors (subtests) with associated items were then selected for inclusion in Form 2 of the ES. Preliminary titles and representative items for each of these factors are given below.

Tendency to be Energetic

I think I am a very lively individual.  
I'm usually full of pep.  
I like to be busy and active.

Tendency to Exhibit Self and Products to an Audience

I like to show things I make to my classmates  
I like to do problems on the blackboard  
I do more talking in class than most of the others around me

Gregariousness

I like to go to lots of parties  
I am a shy person  
I like activities in which the whole class participates

Need for Attention and Approval

What I want most in school is to be noticed by others  
I often stop after class and talk to the teacher  
I generally enjoy being the center of attention even if people laugh at me

Need to Amuse Others

I like to do things in class that make people laugh  
I like to "liven things up" in school  
My friends think I'm pretty funny

Argumentativeness

I like to be involved in debates  
When someone in my class says something wrong, I like to argue about it  
I believe in expressing my opinion in class

Extroversive Enthusiasm Versus Introversive Passivity

In class, I would rather talk about things than work on assignments  
I enjoy working by myself in class  
I'll do anything to spark up a dull class

The seven preliminary item subdivisions identified at stage two were represented in the WIT-I (100 "true-false" statements), WC (50 word pairs) and PCS (32 item pairs) formats. The major change at this stage involved dropping the Q-sort (WIT-II) which took more time to administer (30 minutes) than would be available for the administration of the ES during the experimental year of the research. Other changes involved dropping items and inserting new ones in each of the three remaining test formats. At this point, the test required one 40-minute class period to complete.

### Stage Three

Form 2 of the ES was administered to approximately 225 eighth graders during a 40-minute class period. Following this, items were divided into three groups (A, B, and C) and each item group was subjected to a principal components analysis with a varimax rotation. Analysis A consisted of 68 items classified under the categories, Tendency to be Energetic, and Tendency to Exhibit Self and Products to an Audience. Analysis B included the 53 items in the categories, Gregariousness and Need for Attention and Approval. Analysis C included the 76 items classified under the categories, Need to Amuse Others, Argumentativeness, and Extroversive Enthusiasm Versus Introversive Passivity. Identical items were logically related to more than one dimension.

As indicated in the description of test development procedures given in Appendix E, the results obtained in the varimax rotations at stage three were of primary importance in establishing the statistical homogeneity of the hypothesized item groupings or subtests. Generally, it was expected that the subtests would be established on the basis of the first two or three rotated factors, or could be constructed by combining smaller and more specific statistically and logically related factors. For example, the hypothesized item groupings included in analysis A might be substantiated in the first two rotated factors, hopefully the two largest, or constructed on the basis of the intercorrelations and logical relationships among a larger number of smaller and more specific factors. The latter procedure, it will be recalled, proved useful in forming the subtests of the SAS (see Appendix E). However, the results of the varimax rotations accomplished in analyses A, B, and C at this stage of the construction of the ES were disappointing in that a very large number of small specific factors were realized. Analysis A resulted in 23 specific factors (1-10 items); varimax factor variances ranged from roughly 11 to 3

per cent. Analysis B resulted in 18 specific factors (1-8 items); varimax factors variances ranged from 9 to 4 per cent. Analysis C yielded 27 specific factors (1-7 items); varimax factor variances ranged from 5 to 3 per cent.

For two reasons, it proved virtually impossible to combine this large number of factors into larger item groups or subtests while meeting the dual criterion of logical and statistical homogeneity. The first of these involved the size of the factors most of which consisted of one to three items. It proved difficult to attach any psychological meaning to these small factors in many cases. The second reason also involved interpretation which was made even more difficult by the fact that some factors were composed of items which were logically inconsistent.

At this time, the project was also faced with the practical problem of fitting the four test batteries into two 40-minute testing periods. Both the compulsivity battery and the SAS met the requirements of testing time in that they could be administered in a single 40-minute period. However, the creativity battery was eight minutes longer than the required 20, and could not be easily reduced without seriously affecting the test. The obvious solution was to reduce the size of one of the remaining three test batteries. The ES at this stage became the obvious candidate due to the problem met in developing specific subtests of exhibitionism. This was accomplished by selecting items for inclusion in the final form of the ES on the basis of loadings in the first factor of the principal components analyses A, B, and C. A further constraint on item selection involved selecting items to insure that total test content would represent a broad range of behaviors and attitudes associated with exhibitionism. The results of this selection procedure are summarized in Table 41, which shows: (a) the item composition of the final form of the ES with associated test formats; and (b) the factor loadings of the items in the first general factor of the principal components analyses A, B, or C.

#### Descriptive Statistics and Construct Validity

This section presents a resume of descriptive statistics for the ES based on its administration during the experimental year of the research. Evidence relevant to an evaluation of the construct validity of the ES is also briefly considered.

Table 41  
Analyses A, B, and C: Factor Loadings and Item Composition  
of the Final Form of the Exhibitionism Scale<sup>1</sup>  
(N = 304)

Test Format	Items	Exhibition- ist Answer	Loadings for Analyses		
			A	B	C
True- False	1. I believe in doing daring things just to amuse people.....	True			.51
	2. I like to go to lots of parties.....	True	.38		
	3. I enjoy giving reports in front of the class.....	True			.52
	4. I am quiet.....	False	.47		
	5. My friends say I've got lots of "get-up-and-go"..	True	.46		
	6. I am a bashful person....	False		.49	
	7. I usually keep in the background at parties and other social occasions...	False		.58	
	8. I generally enjoy being the center of attention, even if people laugh at me.....	True		.47	
	9. I would like to be on the stage in front of many people.....	True			.46
	10. I feel funny when I walk into a room full of people	False		.41	
	11. I dislike classes in which there is very little discussion.....	True			.44
	12. I'm usually full of pep..	True	.41		
	13. I like to show off in school to make my friends laugh.....	True			.44
	14. I am a shy person.....	False		.58	
	15. Every time I get a chance to do something in front of class, I take it.....	True	.41		
	16. I believe in expressing my opinion in my classes.	True			.54
	17. I am quite shy with the opposite sex.....	False		.55	

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Table 41  
(Continued from Previous Page)

Test Format	Items	Exhibition- ist Answer	Loadings for Analyses		
			A	B	C
Word	18. (A) stage.....audience (B)	A	.42		
Choice	19. (A) calm.....lively (B)	B	.39		
	20. (A) patient....vigorous (B)	B	.41		
	21. (A) exposed...concealed (B)	A	.47		
	22. (A) showing...listening (B)	A	.57		
	23. (A) fun.....scholar (B)	A			.48
	24. (A) theater.....party (B)	B		.44	
	25. (A) display.....look (B)	A	.45		
	26. (A) appear.....observe (B)	A	.50		
	27. (A) reserved..talkative (B)	B		.51	
	28. (A) sociable.....quiet (B)	A		.53	
	29. (A) observe.....show (B)	B	.53		
	30. (A) quiet.....brisk (B)	B	.53		
	31. (A) attend.....perform (B)	B	.59		
	32. (A) noisy.....silent (B)	A	.48		
	33. (A) thrill.....calm (B)	A	.42		
	34. (A) watch.....act (B)	B	.57		
	35. (A) humorous..respected (B)	A			.43
-----					
Forced	36. Would you judge yourself to				
Choice	be:				
	A. more enthusiastic than				
	the average person				
	B. less excitable than the				
	average person	A	.40		
	37. Would you rather				
	A. sit near the back row				
	in class				
	B. sit near the front row				
	in class	B			.47
	38. Do you				
	A. show your feelings freely				
	as you go along				
	B. keep them to yourself	A			.47

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Table 41  
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Test Format	Items	Exhibition- ist Answer	Loadings for Analyses		
			<u>A</u>	<u>B</u>	<u>C</u>
39.	Would you rather A. join in activities like playing in the band, playing "touch football" and holding a school office B. join in activities like photography, rock collecting, and stamp collecting	A		.40	
40.	At a party, do you like A. to help get things going B. to let the others have fun in their own way	A		.41	
41.	Would you rather A. read books and plays B. be the center of atten- tion in a group	B		.43	
42.	At parties, do you A. sometimes get bored B. always have fun	B		.48	
43.	Would you rather A. listen to the teacher tell about an interest- ing thing in class B. participate in class discussion	B		.40	
44.	When there is an argument going on A. I like to put in my two cents worth B. I try to do what I can to stop it	A			.40
45.	At parties, do you A. talk quietly to a few people B. joke and laugh with almost everyone	B		.66	

<sup>1</sup>Loadings shown are those obtained in the first general factor of the principle components analyses A, B, and C. Items with low loadings have been eliminated in the tables.

Table 42 shows the descriptive data for the ES based on the combined experimental and control groups. The discrimination indexes indicate that all items discriminated in the appropriate direction; the bulk of the items discriminated somewhat less than moderately, and two items had low discriminating power. These data and the overall mean discrimination index of 27.13 are in accord with the previously noted generality of the characteristic measured by the ES. The K-R 20 reliability coefficient of .85 indicates that ES scores for the experimental year of the research reached an acceptable level of internal consistency.

Table 42  
Discrimination Indexes for Items in Final Form  
of the Exhibitionism Scale<sup>1</sup>  
(N = 1136)

Item No.	Discrimination Index	Item No.	Discrimination Index
1	8	24	27
2	25	25	27
3	13	26	34
4	39	27	35
5	25	28	26
6	39	29	32
7	34	30	37
8	23	31	36
9	28	32	42
10	19	33	25
11	23	34	40
12	14	35	24
13	12	36	34
14	43	37	7
15	16	38	27
16	24	39	22
17	35	40	27
18	19	41	39
19	26	42	24
20	37	43	29
21	29	44	14
22	37	45	33
23	12		
K-R 20 Reliability = .85		SD Raw Scores = 7.55	
X Raw Scores = 24.81		X Discrimination Index = 27.13	

<sup>1</sup>Based on the difference between upper and lower halves.

Evidence for the construct validity of the ES is very meager at this point. Teacher ratings of exhibitionism based on classroom observations of 860 eighth graders correlated at a low but significant level with ES scores ( $r = .29$ ;  $p < .005$ ). Additional expectations for exhibitionism in this study were based on a similar characteristic researched in adults. This research suggests that the person high on exhibitionism would be correspondingly low on questionnaire measures of anxiety (Erikson and Davids (17), Jones (33)) and impulsive as contrasted to compulsive (Knapp (35)). Tables 43 and 44 show that these expectations were generally confirmed in the present study. ES scores were correlated consistently and significantly in the negative direction with the various scores for anxiety and compulsivity.

Table 43  
Correlations of Exhibitionism with Compulsivity Scores  
(N = 1000)

	<u>r</u>	<u><math>\bar{X}</math></u> <sup>a</sup>	<u>SD</u> <sup>a</sup>
Exhibitionism	-----	56.60	16.40
Meticulousness <sup>c</sup>	-.17***	68.59	18.22
Drive to Finish <sup>c</sup>	-.11***	65.14	23.27
Intolerance of Indefiniteness <sup>u</sup>	-.20***	53.43	19.41
Cautiousness <sup>c</sup>	-.19***	70.21	21.37
Uncomfortableness in Social Relations <sup>u</sup>	-.26***	43.04	22.07
Intolerance of Incompleteness <sup>c</sup>	-.16***	75.94	20.21
Paralyzed Initiative <sup>u</sup>	-.15***	53.59	21.39
Total Compulsivity	-.33***	61.62	10.86

<sup>a</sup> Means and SDs were calculated from per cents.

<sup>c</sup> Constructive compulsivity.

<sup>u</sup> Unconstructive compulsivity.

\* $p < .05$  (one-tail).

\*\* $p < .025$  (one-tail).

\*\*\* $p < .005$  (one-tail).



Table 44  
Correlations of Exhibitionism with Anxiety Scores  
(N = 1000)

	<u>r</u>	<u><math>\bar{X}</math></u> <sup>a</sup>	<u>SD</u> <sup>a</sup>
Exhibitionism	-----	56.60	16.40
General Emotionality	-.06**	38.08	30.15
General School Anxiety	-.11***	32.89	26.39
General Classroom Anxiety	-.05*	39.85	21.78
Anxiety Personal Relations Peers	-.26***	27.41	23.55
Parental Pressure Achievement	.06	49.43	24.23
Anxiety Personal Relations Teacher	-.13***	46.11	17.44
Test Anxiety	-.08***	47.89	26.53
Total Anxiety	-.13***	41.51	15.14

<sup>a</sup>Means and SDs were calculated from per cents.

\*p < .05 (one-tail).

\*\*p < .025 (one-tail).

\*\*\*p < .005 (one-tail).

## APPENDIX D

### DEVELOPMENT OF THE VERBAL CREATIVITY BATTERY

In designing the creativity test, our first step was to examine widely accepted conceptual and operational definitions of the construct. It soon became apparent that there are two basic viewpoints; creativity is considered both as a cognitive skill, and as a personality disposition. These two viewpoints were accepted as representing the main categories and were then used in selecting and/or devising various tests.

Working from a cognitive viewpoint, J. P. Guilford developed the now widely used paper-and-pencil tests of divergent or creative thinking ability. Guilford and Merrifield (27) assert that divergent thinking may be synonymous with generally accepted conceptions of verbal creativity. Analysis of divergent thinking revealed four basic sub-factors: fluency, flexibility, originality, and elaboration.

Still in the cognitive framework, Mednick (47) presents another theoretical approach to verbal creativity. He believes that the basic factor underlying creativity is a "flat associative hierarchy." By this, he means that for the creative individual, the associations established between the various stimuli in his environment and his responses to them are weaker than for the less creative person. Because of this, the creative person responds less rigidly to stimuli and is better able to form new, creative associations.

Based on a review of studies of the personality of the creative individual, it was decided that two characteristics were well enough substantiated to merit consideration. The first of these was the creative individual's high level of self-confidence and relative independence of the opinions of others (Barron (3), Cattell et al. (6), MacKinnon (41)). The second typical trait is the creative person's preference for asymmetry, complexity, and disorder (Barron and Welsh (4), MacKinnon (41)). Since these findings and associated measuring instruments were established with adults, it was necessary in the present research to adapt and refine them for use with early adolescents.

Based on the two major views toward creativity, a number of specific instruments were selected and/or adapted for use in the initial battery. This initial battery required approximately 80 minutes to complete and was reduced and refined through two successive stages of analysis and interpretation. During each stage, the test battery was reduced by approximately one-half

with the intent of developing a battery that could be administered in 20 minutes. Factor analysis was the major analytical technique used at each stage. The intent was to develop and refine (or substantiate) a number of statistically and conceptually independent subtests relating to both the cognitive and dispositional aspects of creativity. The remaining sections of this report document the details of test development and refinement at each stage.

### Stage One: The Initial Creativity Battery

The first section of the instrument consisted of four subtests and was concerned with self-report personality measures. Subtest I, More Like Me, was a forced-choice set of items built up from the autonomy-deference scale of the Edwards Personal Preference Schedule (16), and was used to measure independence. Subtests II and III, I Would Rather and Which Do You Prefer?, were also sets of forced-choice items used to measure independence, and consisted of pairs of tasks and occupations. One of each pair markedly requires more independence than the other. The items were selected from an item pool of jobs and tasks which a group of 40 adolescents ranked according to the independence they felt each would require. Subtest IV, Which Picture Do You Like, was adapted from the Barron-Welsh Figure-Preference Test (4) for use as a measure of preference for asymmetry and complexity.

For the cognitive aspect of creativity, six instruments were selected and adapted for use in the initial battery. Two of these, the Anagrams and Word Associations tests, were intended to measure associational flexibility via the Mednick framework. Sources of the tests were Mednick's (47) Remote Associations Test and Torrance's (65) Common Associates Test.

The remaining four subtests in the cognitive section of the battery were selected from tests of verbal creativity developed by Torrance and associates. The imagination subtest required the S to write an imaginative story in response to a pictorial stimulus. Responses were scored from zero to two for each of 23 characteristics identified as typical of creative stories (Torrance, Peterson, and Davis (67)). The subtests, Asking Questions, Guessing Consequences, and Unusual Uses, were taken from Torrance's Minnesota Tests of Creative Thinking (66). Each of these subtests were scored for fluency (total of relevant responses), flexibility (total of relevant categories of response), and originality (from 0 to 2 points per response, depending on its statistical rarity). Scoring was based on the manual provided by Torrance and Templeton (68). The Unusual Uses subtest received an additional score for elaboration (total of relevant elaborations).



Three additional subtests were included in the initial battery for the purpose of measuring convergent thinking ability. The Ship Destination Test (Christensen and Guilford (7)) required students to conceptualize the course of a ship over a matrix (entirely from verbal instructions), to consider adjustments for current and wind, and finally to compute the relative mileage of the ship from beginning to end of its "voyage." The Logical Reasoning test (Hertzka and Guilford (31)) is of the well-known syllogistic type, with the answers in multiple-choice form. The third convergent thinking test was, Synonyms and Style (Jattell, et al. (6)), and is a multiple-choice test of vocabulary and grammar.

#### The First Pilot Administration

The initial battery was administered to 279 students in four junior high schools in New York State. Factor analysis of the creativity subtests produced a first general factor which accounted for 48 per cent of the variance. The loadings on this first factor are presented in Table 45. Since each of the remaining factors accounted for 10 per cent of the variance or less, no attempt to identify them was made, and they are not presented in Table 45. The first general factor was considered large enough to make decisions about keeping or eliminating subtests from the battery.

#### The Second Creativity Test

On the basis of these data it was clear that the personality measures were inadequate for our purposes. Separate factor analyses of each subtest also proved disappointing. A possible explanation for this result is that the measurement attempts were based almost entirely on research done with adults as subjects. It may also be that the instruments used were inadequate. At any rate, the measures of personality were eliminated in the second battery.

The Word Association Test also did not meet requirements and was eliminated from the second battery. Torrance's Unusual Uses test was also eliminated, although factor loadings (aside from elaboration) were not unacceptably low. It was discarded because it proved necessary to eliminate one more subtest in order to have a battery 40 minutes in length, and the loadings for this subtest were lower than for those retained.



Table 45  
Unrotated Loadings of the Creativity Subtest Scores  
on the First General Factor

<u>Subtest Name</u>		<u>Loadings<sup>a</sup></u>
1.	Combined Subtests of Creative Personality (Subtests I, II, III, and IV). . . . .	.23
2.	Anagrams (V). . . . .	.41
3.	Word Association Test (VI). . . . .	.29
4.	Imagination (VII). . . . .	.45
5.	Asking Questions (IX)	
	a) Fluency. . . . .	.75
	b) Flexibility. . . . .	.64
	c) Originality. . . . .	.61
6.	Guessing Causes (X)	
	a) Fluency. . . . .	.84
	b) Flexibility. . . . .	.68
	c) Originality. . . . .	.82
7.	Guessing Consequences (XI)	
	a) Fluency. . . . .	.80
	b) Flexibility. . . . .	.67
	c) Originality. . . . .	.70
8.	Unusual Uses (XII)	
	a) Fluency. . . . .	.66
	b) Flexibility. . . . .	.55
	c) Originality. . . . .	.50
	d) Elaboration. . . . .	.03

<sup>a</sup> Rounded to two places.

A varimax rotation led to a discovery which called for a change in scoring of the three Torrance tests retained for the second battery. The three subscores (fluency, flexibility, and originality) factored out by subtest, and not subscore type. That is, instead of the three subscores for fluency coming out as a group, each subscore for fluency was grouped with the other two subscores in each subtest. This was interpreted as meaning

that although each subscore type for each task is theoretically independent of the other two subscores, it was not empirically independent. This led to the decision to score each subtest for only one subscore type. The unrotated factor loadings were used in choosing the best combinations, which were as follows: Asking Questions was scored for flexibility, Guessing Causes was scored for originality, and Guessing Consequences was scored for fluency.

Experience in administering the subtests suggested two additional changes. Because the anagram test word, "GENERATION," had two "e's" and two "n's," it was necessary to explain that these letters could be used twice, but not the others, causing several students some difficulty. This word was replaced with "LUBRICATE," which also allowed numerous combinations but avoided the earlier problem.

A substantial number of students had been unable to complete their stories for the "Imagination" subtest. Time allotted for this test was increased from five to eight minutes. Also, in a separate factor analysis of this subtest, it was found that 11 of the original 23 characteristics loaded on the first general factor. No other factors were discernible, so a total score for these 11 characteristics only was used in the scoring of the second administration of this subtest.

Table 46 is a list of the subtests chosen for the second battery. Also shown are the communalities derived from the factor analysis of the larger battery as shown in Table 46. It will be noted that in each case, the variance accounted for by the common factors is encouragingly high.

Table 46  
Subtests Retained in Second Creativity Test  
and Their Communalities

<u>Subtest Name</u>	<u>Communalities<sup>a</sup></u>
1. Anagrams. . . . .	.65
2. Imagination. . . . .	.95
3. Asking Questions (flexibility). . . . .	.72
4. Guessing Causes (originality). . . . .	.75
5. Guessing Consequences (fluency). . . . .	.94

<sup>a</sup>Rounded in two places

As a result of consultation with Dr. Phillip Merrifield, the initial tests of convergent thinking were replaced by the Gestalt Transformation test (called Useful Objects in the battery) and the Object Synthesis test (called Combining Objects in the battery) developed by Guilford (25) (26).

Content and scoring of subtests in the first revision of the creativity battery are given below:

1. Anagrams:

Students were instructed to make as many other words from the letters of the word "lubricate" as they could, without re-using any of the letters more than once. Four minutes were allowed for this task. The score received on this subtest was the total number of legitimate words given.

2. Imagination:

For this subtest, subjects were instructed to write as imaginative and divergent a story as they could about a picture of a cat and a box. Each story was scored for imagination from zero to two on the basis of 11 criteria typically found in creative stories. Total time allotted for this subtest was eight minutes.

A score of zero indicates the absence of one of the 11 characteristics, a score of one indicates that the characteristic is present, and a score of two was given when the characteristic was unusually apparent in the student's writing. The 11 characteristics used in scoring are: (1) picturesque speech; (2) vividness; (3) original setting or plot; (4) individuality of style; (5) becomingness (the author identifies with his characters); (6) imagination (fantasy); (7) finding the essence (a dimension of conciseness or succinctness); (8) perceptive sensitivity (use of metaphors and analogies); (9) flexibility or versatility (fresh, vigorous language; absence of cliches); (10) coherent unity of story; and (11) expressive communication (expression of mood). Total score possible is 22.

3. Asking Questions:

This subtest was scored for flexibility. Subjects were asked to respond with as many relevant questions about

a picture of an elf looking into a pool of water as they could in five minutes. Questions could not be answerable merely through inspection of the picture. One point was scored for a relevant response made in any of 21 categories such as location and setting of the picture, physical action unrelated to the surface, meaning and general interpretation of the picture, occupation of the person in the picture, etc. Thus the maximum obtainable score on this subtest is 21.

#### 4. Guessing Causes:

This subtest was scored for originality. The same stimulus picture was used as in the Asking Questions Test. Subjects suggested as many causes of the elf's behavior as they could in five minutes. Responses were scored from zero to two, depending upon their predetermined statistical rarity. The statistical rarity of a response is based upon responses obtained for a large sample. Responses typically made by more than five per cent of the standardization sample received a score of zero. Responses typically made by from two to five per cent of the standardization group received a score of one. Any other relevant responses received a score of two.

Examples of the most common responses (no points) are:

"He is lost in the woods."

"He is going to get a drink."

Examples of less common responses (one point each) are:

"He wants to see if his hat is on straight."

"He is playing hookey from school."

An unusual (two-point response) was:

"He thinks his girl-friend is drowning."

#### 5. Guessing Consequences:

This subtest was scored for fluency. The elf picture is also used for this subtest. Subjects were asked to suggest as many results of the action in the picture as they could in five minutes. One point is scored for each relevant consequence given by the student.



## 6. Useful Objects:

This is a speed test consisting of ten items, for which students are allowed five minutes after instructions. A task was given the students and they were to select one of five items some part of which could be used to complete the task. One part of the construct of convergent thinking being measured by this test is the ability to follow directions closely. A sample item follows:

To start a fire:

- a. Fountain pen.
- b. Onion.
- c. Pocket watch.
- d. Comb.
- e. Bowling ball.

The correct answer is "c", because the crystal could be used as a burning glass.

## 7. Combining Objects:

Students are presented with the names of two objects, and were asked to suggest a third object which could be made from the first two. Only these first two objects could be used, and both must be included in the new object. For example: Given: rubber sponge and screw \_\_\_\_\_. An acceptable answer would be "shoe scraper." Twelve combinations were presented, and total time allowed was five minutes.

## The Second Pilot Administration

During April and May, 1965, the revised battery was administered to 253 students in three junior high schools in New York State. The unrotated factor analysis for this administration of the creativity battery produced a first general factor which accounted for 64 per cent of the variance. As in the first factor analysis, this was considered high enough to make decisions about the subtests. The unrotated loadings of the subtests on the first general factor are reported in Table 47.

Table 47  
Unrotated Loadings of the Creativity Subtests  
on the First General Factor

<u>Subtest Name</u>	<u>Unrotated Loading</u> <sup>a</sup>
1. Anagrams. . . . .	.25
2. Imagination. . . . .	.53
3. Asking Questions (flexibility). . . . .	.58
4. Guessing Causes (originality). . . . .	.48
5. Guessing Consequences (fluency) . . . . .	.57

<sup>a</sup>Rounded to two places.

#### The Third Creativity Test

A varimax rotation did not produce substantially different loadings from those given in Table 47. Inasmuch as the Anagrams subtest is quite like the fluency factor (for which the Guessing Consequences subtest is scored), and since it had the lowest loading on the first factor (.25), it was eliminated from the battery. The other subtests were considered adequate and were retained.

Item analysis of the convergent measures were computed, and the Useful Objects subtest was seen to be the best available measure of convergent thinking. Six of the ten items on this subtest differentiated well between high and low scorers and so were retained. Time allowed was reduced from five to three minutes. The Useful Objects subtest had a Kuder-Richardson split-halves reliability of .57. Test-retest reliability coefficients for the creativity battery for a three-week period, are reported in Table 48.

The final battery of the Student Abilities Survey is included at the end of this Appendix.

Table 48  
 Five-Month Test-Retest Stability Coefficients  
 for Five Verbal Creativity Scores  
 (N = 219)<sup>1</sup>

<u>Subtest</u>	<u>Stability Coefficient</u>
Imagination . . . . .	.06
Flexibility . . . . .	.38
Originality . . . . .	.14
Fluency . . . . .	.45
Total Creativity. . . . .	.38

<sup>1</sup>The subjects upon which the coefficients are based participated in the present study and served as a control group in another study reported by Dacey and Ripple (14). Procedures for readministration of the creativity battery were the same as those for the initial administration.

## THE STUDENT ABILITIES SURVEY

Name \_\_\_\_\_

This is a survey to find out how well sixth grade students are able to perform certain tasks. Simply do each task as quickly as possible. Sign your name on this page and all others which have a line for it.

When I tell you to stop working and go to the next page, please do so immediately. Now, when I tell you, turn the page and begin answering.

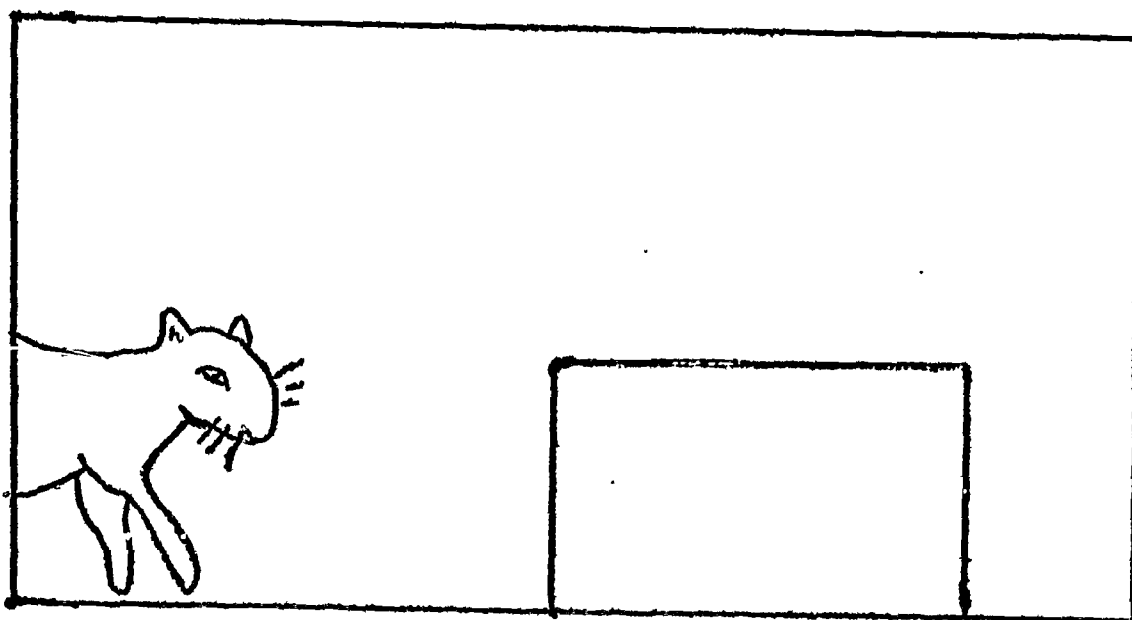
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Not to be used without permission of the authors. Permission for use of this survey for research purposes will be granted upon request.



# 1. IMAGINATION

You are to look at this picture and make up a story about it. The more words you use, the better. Try to make it a story no one else in the class would think of. Be as different from the others as you can. Try to give your story an imaginative title. Write your story on the next page. You have eight minutes working time. Begin.





### ASK-AND-GUESS TESTS

The next three tasks will be based on the drawing below. These tasks will give you a chance to see how good you are at asking questions to find out things that you don't know, and at making guesses about possible causes and consequences of events. Look at the picture. What is happening? What can you tell for sure? What do you need to know to understand what is happening, what caused it to happen and what will be the result?



## 2. ASKING QUESTIONS

Name \_\_\_\_\_

On this page, write out all of the questions you can think of about the drawing on the page opposite this one. Ask all of the questions you need to know for sure what is happening. Do not ask questions which can be answered just by looking at the drawing. You can continue to look back at the drawing as much as you want to. You have five minutes working time. Begin.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_

STOP HERE AND WAIT FOR FURTHER INSTRUCTIONS.

D-15





D-16

### 3. GUESSING CAUSES

Name \_\_\_\_\_

In the spaces below, list as many possible causes as you can of the action shown in the picture. You may use things that might have happened just before the event in the picture, or something that happened a long time ago that made the event happen. Make as many guesses as you can. Don't be afraid to guess. You have five minutes working time. Begin.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_

STOP HERE AND WAIT FOR FURTHER INSTRUCTIONS.

D-17



D-18

4. GUESSING CONSEQUENCES: Name \_\_\_\_\_

In the spaces below, list as many possibilities as you can of what might happen as a result of what is taking place in the picture. You may use things that might happen right afterward or things that might happen as a result long afterward in the future. Make as many guesses as you can. Don't be afraid to guess. You have five minutes working time. Begin.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_

STOP HERE AND WAIT FOR FURTHER INSTRUCTIONS.

D-19



## APPENDIX E

### DEVELOPMENT OF THE SCHOOL ANXIETY SCALE

This section of the report presents a brief summary of the procedures used in the development of the School Anxiety Scale (SAS), and the characteristics of this instrument as it was used during the experimental year of the research.

#### General Conceptual Definition of Anxiety

The conceptualization of anxiety which guided test development was derived largely from the research of Sarason et al. (54). According to this view anxiety is a stable response tendency, composed of physiological or somatic reactions, which is realized by the subject as a generalized state of unpleasantness. The anxious response(s) may be elicited by one or a fairly broad range of common situations, depending upon the individual.

#### Summary of Procedures for Test Construction and Development

Beginning with the basic stimulus-response definition, the initial intent was to construct a measure of the student's tendency to react with anxiety in and/or associated with the school situation. This relatively general construct of anxiety, it was decided, could be further divided into several smaller and relatively independent constructs such as test anxiety, teacher anxiety, recitation anxiety, and so on. Procedures for test construction and development therefore consisted of the construction of a number of specific subtests, each of which could be coordinated with the general construct of school anxiety, but would measure anxiety as a function of a narrow range or class of school stimuli.

The development of the anxiety subscales proceeded in three stages. The first stage involved the selection and composition of a large number of items relevant to the construct which were to be presented in several test formats. Items generally consisted of two types: (1) "transparent" items which contained a referent for anxiety (e.g., worry, fear) and a specific situational stimulus (e.g., teacher, test); and (2) "objective" items which attempted to measure anxiety indirectly (e.g., "I would be very concerned if I were late for class."). Following the construction of the item pool, items were then grouped into 31 logical a priori subdivisions. Four test formats were selected or constructed and the a priori subdivisions with associated items were distributed

as equally as possible over the test formats. At this point, the test required 317 responses and two 40-minute classroom periods to complete. The remaining stages of the test development procedure would eventually reduce the test to the required 20-minute battery. A description of the test formats in the initial form of the SAS (Form 1) follows.

The Situation Interpretation Schedule (SIS) consisted of 20 statements describing classroom or school-related situations (e.g., "You are getting ready to go to bed after studying for an important exam to be given tomorrow."), each of which was coordinated with seven different modes of response indicative of an internal anxiety state (e.g., "heart beats faster," "feel afraid," "feel tense"). Each of the seven response modes was presented in conjunction with a five-point scale (A-E) wherein the S could indicate the intensity of his anxiety reaction. Responses to the SIS were scored from 1 (low anxiety) to 5 (high anxiety).

The Student Opinion Survey (SOS) was composed of 150 statements of the "transparent" and "objective" types. The student was required to judge whether each statement was true of him, and respond by marking a "yes" or "no". Responses scored as anxious were either "yes's" or "no's", with "yes" being the predominant response indicative of anxiety.

The Junior High School Attitude Survey (JHSAS) consisted of 22 five-point scales, each with a mid-point and two extremes. The latter were indicative of an intense anxiety experience at one extreme. Each scale had an appropriate stimulus consisting of one to three words presented over the mid-point (e.g., "during test"), and an adjective at each extreme which was descriptive of either the anxiety reaction (e.g., "tight") or its opposite (e.g., "loose"). The anxiety end of each of the 22 scales was randomly distributed. Responses to each item in the JHSAS were scored from 1 (low anxiety) to 5 (high anxiety).

The Sentence Construction Test (SC) consisted of 15 words or phrases which the student was directed to use in writing five sentences indicative of his feelings and thoughts about school. The nuclei of the sentences were constructed to yield responses concerning the student's feelings about the major anxiety inducing events in the school situation (e.g., "marks are ...", "tests cause ..."). Responses were scored 0, 1, or 2 on the basis of the intensity of the anxiety experience indicated in the Ss' sentences. Total possible score was 10.

## Stage Two

In stage two, following the initial construction of the SAS, the items were administered to approximately 350 eighth graders during two classroom periods. Fifteen of the 31 a priori subdivisions were then each subjected to a principal components analysis with a varimax rotation. Subtests were then selected for inclusion in a reduced version of the SAS on the basis of: (1) the amount of item variance accounted for by a given factor in the rotated factor matrix; and (2) logical consistency of the items within the rotated factor. Items within subtests were eliminated on the basis of: (1) low loadings on the first principal components; and (2) low loadings and/or a lack of logical relationship to the varimax factor.

From the 15 factor analyses accomplished at stage two, 10 factors (subtests) with associated items were selected for inclusion in Form 2 of the SAS. Preliminary titles and a short description of each factor (subtests) are given below:

Parental Pressure for Achievement consisted of items which were indicative of anxiety about school induced through parental behaviors (e.g., "I usually feel pretty relaxed when I bring home my report card.").

Fear of Evaluation was composed of items indicative of anxiety or fear over report card marks, test marks, and other evaluative events occurring in the typical classroom.

Fear of Teacher's Punitive Behaviors contained items indicative of anxiety or fear over a variety of punitive classroom situations associated with the teacher's role. Items also referred to instances of negative teacher behavior (e.g., criticism, lack of praise).

Generalized School Anxiety consisted of items indicative of anxiety about school, expressed in situations removed from school.

Anxiety Over Personal Relations with Teacher was composed of items which were phrased indirectly to obtain indications of anxiety as experienced by the student in conjunction with his personal dealings with the teacher (e.g., "I often feel that my teacher and others are going to tell me I am doing things the wrong way.").

Concern Over Ability to do School Tasks contained general statements indicative of the student's tendency to react with



anxiety during performance on school tasks. A few statements were specific to school subjects.

Emotional Responsiveness was composed of items which were suggestive of a generalized tendency to react "fast" with emotion (primarily anxiety) to every titillating event. Presumably a high score on this factor would indicate little emotional control and a lack of appropriate and flexible defenses in dealing with anxiety.

General School Anxiety consisted of general statements referring to anxiety as experienced in the classroom or associated with school attendance (e.g., "I am usually pretty relaxed in school.").

Test Anxiety contained items referring to anxiety experienced before, during, or after taking school tests.

Peer Anxiety was composed of items indicative of anxiety experienced as a function of interpersonal relationships with peers in the classroom and the school.

The ten preliminary subtests (factors) and associated items used in Form Two of the SAS were represented in the SIS and SOS formats. The SOS format was changed from a "yes-no" response mode to "true-false", to eliminate ambiguities present in certain items. The SIS format was changed to include four of the initial seven response modes ("heart beats faster," "get an uneasy feeling," "feel afraid," and "feel tense"), each of which was associated with one of 17 different school situations. These four response modes loaded consistently as a group in the factor analyses accomplished at stage one, whereas the remaining three tended to load as specific factors. It is interesting to note that the three rejected response modes were all physiological ("mouth gets dry," "stomach gets upset," and "perspire").

Rejection of the JHSAS and SC formats for use in Form Two was decided on the following bases. The protocols obtained from the administration of the SC during stage one proved expensive to score reliably, and made only a small contribution (in terms of number of items) to the total test battery. Also, responses to the SC did not contribute in terms of unique and important factors. Items from the JHSAS did not load as highly and consistently on the ten factors selected for Form Two as did items from the SOS and SIS, possibly because the school situations presented in the JHSAS were more ambiguous, consisting of only one to three words. Rejection of items and formats were also influenced by the necessity of reducing the SAS to



half its original size at the conclusion of stage one. Thus, the elimination of the JHSAS and SC, plus items from the SIS and SOS at the conclusion of stage one, resulted in a test of the size appropriate for administration during stage two. Form Two of the SAS required 168 responses, with 100 items presented in the SOS format and 17 items (4 responses per item) presented in the SIS format).

### Stage Three

Form 2 of the SAS was administered to approximately 250 eighth graders during a 40-minute class period. Following the administration, items were divided into groups A, B, and C, and each group was then subjected to a principal components analysis with a varimax rotation. Analyses A and B consisted of SOS items divided into two groups each, of five a priori subdivisions, with 64 items included in analysis A and 58 items in analysis B. The five a priori-subdivisions included in analyses A and B were selected to obtain maximum distinction between subdivisions within groups. Identical items were included ("crossed") in both analyses A and B where it was apparent that they were logically related to more than one dimension. The separate analysis was accomplished for SIS items (analysis C) because an initial analysis, combining items from both the SIS and SOS, indicated that differences in test formats influenced factor composition.

The results of the separate factor analysis of items in the SIS (analysis C) were disappointing in that the bulk of the items loaded on the first factor in the varimax matrix; that is, consistent differentiation of situations in terms of factors was not obtained. The decision was then made to reject the SIS for use in the final form of the SAS. Further details of the results are thus restricted to analyses A and B for items in the SOS format.

Analysis A resulted in 20 small specific factors (1-10 items); varimax factor variances ranged from 12.09 per cent for factor one, to 3.69 per cent for factor 20. Analysis B resulted similarly in 19 small factors (1-12 items); varimax factor variances ranged from 11.40 per cent for the first factor to 3.54 per cent for factor 17, the smallest factor. Application of the selection criteria for items and factors, outlined previously, resulted in the selection of 11 factors with associated items for Analysis A. Analysis B yielded nine factors with associated items deemed usable for the final form of the test.

Further examination of item content and the intercorrelations of the factors in each analysis indicated that, in some cases, factors were both logically and statistically related. Where this was apparent, the best items for two or more related factors (i.e., those items which loaded best) were then combined into a single dimension or subtest. Items retained from stage three for the final form of the SAS are shown in Tables 49 and 51, with the varimax factor loadings from the appropriate analysis (i.e., A or B). Rejected items and items with low loadings have been eliminated in the tables. The associated varimax factor score intercorrelations are presented in Tables 50 (analysis A) and 52 (analysis B).

The general procedure described above resulted in the formation of seven anxiety subtests of varying specificity and relevance to the school situation. A brief discussion of the content and formation of each subtest follows. Supporting data are presented in Tables 49 through 55.

Analysis A: Factor 1 was clearly interpretable as a dimension of test anxiety. Items with the highest loadings on this factor were combined with items selected from factors 7 and 8 (Table 49). As contrasted with factor 1, which indicated worry, anxiety, and concern over the test experience, factors 7 and 8 were more directly concerned with interference and reactions to the test situation. Table 50 shows that scores for factor 1 were correlated .43 with scores for factor 7 and -.35 with scores for factor 8.

As shown in Table 49, items selected from factors 3, 5, 6, 9, 10 and 11 were combined into a single subtest labeled general classroom anxiety. The great majority of the items thus combined consist of general statements reflecting anxiety about being in class, doing well in courses, and remaining calm and relaxed in school or class. Factor three, which consists of general statements indicative of tension, inability to relax, restlessness, and frustration with respect to school, appears to be the strongest and most general of the factors included in this subtest. Ignoring signs, scores for the other factor correlated from .29 to .40 with scores for factor three.

The peer anxiety subtest consisted of statements indirectly indicative of anxiety experienced in peer relationships. The present subtest consists of seven items selected from factors 2 and 4, which correlated -.39.

Table 49

Analysis A:  
 Varimax Factor Loadings and Item Composition of Anxiety Subtests  
 in the Final Form of the SAS  
 (N = 230)

Analysis	Subtest	Factor		
		<u>1</u>	<u>2</u>	<u>3</u>
A	Test Anxiety			
	1. I often worry over the marks I receive on tests.....	.45		
	2. I feel quite nervous and excited while taking a test....	.66		
	3. When I am on my way to school, I often worry that I may have a test that day.....	.59		
	4. When the teacher says she is going to give a test, I find that I feel rather warm and that my palms begin to sweat...		-.51	
	5. I have often worried at night that I did poorly on a test...	.79		
	6. I am afraid of school tests....	.68		
	7. After taking a test, I worry a lot about how well I did.....	.60		
	8. Sometimes my mind goes blank when I first get an exam.....	.69		

(Continued on next page)

Table 49  
(Continued from Previous Page)

<u>Analysis</u>	<u>Subtest</u>	<u>Factor</u>							
		<u>1</u>	<u>7</u>	<u>8</u>					
	9. When I am taking a test, I forget things I knew very well before I started the test.....		.73						
	10. During very important exams, I find that my heart begins to beat rapidly.....		.39						
	11. I worry a lot before taking a test.....		.67						
<hr/>									
A	II General Classroom Anxiety	<u>3</u>	<u>5</u>	<u>6</u>	<u>2</u>	<u>10</u>	<u>11</u>		
	1. In some of the courses I'm taking, I find it hard to stay calm and relaxed.....		.42						
	2. There have been times in school when I felt so tense that I wanted to get out.....		.43						
	3. I am usually pretty relaxed at school.....		.62						
	4. Studying mathematics makes me confused and nervous.....							-.43	
	5. I feel calm and relaxed about the courses I am taking this year.....		.67						

(Continued on next page)



Table 49  
(Continued from Previous Page)

<u>Analysis</u>	<u>Subtest</u>	<u>Factor</u>					
		3	5	6	2	10	11
6.	I'm often concerned about my ability to do well in some of my courses.....						
7.	In discussions in class, I sometimes get so annoyed with others that I can't trust myself to speak.....						
8.	Things are so busy at school, and I have so much work to do, that I practically never feel relaxed anymore.....						
9.	I feel uncomfortable about my future in school.....						
10.	There have been times in school when I felt like shouting.....						
11.	I often feel that school life is pretty frustrating.....						
12.	Often I feel quite tired and washed out when sitting in class						
13.	Often I feel too restless to sit at my desk.....						
14.	I sometimes feel that it is useless to try to do well in school.....						

(Continued on next page)

Table 49  
(Continued from Previous Page)

<u>Analysis</u>	<u>Subtest</u>	<u>Factor</u>	
		2	4
A	III Peer Anxiety		
	1. I often feel that becoming popular in school is beyond my control and there's no sense in trying.....	.43	
	2. I am uncomfortable with my classmates at school because they make me feel on edge.....	.69	
	3. When my classmates are noisy and fool around, it makes me nervous.....		-.66
	4. I feel I am slow in making new friendships.....		-.72
	5. I often doubt that others are really interested in what I have to say.....		-.43
	6. I have a feeling my friends are neglecting me.....	.70	
	7. I often feel that my classmates do not like the way I do things		-.47

Items selected for inclusion in the final form of the SA3 are represented in the table. Rejected items and items with low loadings on the factors have been eliminated in the table.

Items 3 and 5 are scored for test anxiety and generalized school anxiety.

Table 50  
Intercorrelations of Varimax Factor Scores for Eleven Factors in Analysis A  
(N = 230)

	1	2	3	4	5	6	7	8	9	10	11	Factor Variances (%)
1	---											12.09
2	.25	---										5.20
3	.28	.34	---									5.60
4	.12	-.39	-.24	---								5.40
5	-.39	-.32	-.40	.26	---							6.78
6	-.30	-.18	-.35	.12	.33	---						5.33
7	.43	.27	.40	-.15	-.36	-.35	---					5.46
8	-.35	-.29	-.30	.17	.34	.29	-.35	---				4.50
9	.21	.27	.29	-.12	-.31	-.19	.23	.26	---			3.99
10	-.37	-.27	-.37	.24	.32	.30	-.36	.27	-.20	---		5.01
11	.29	.27	.32	-.23	-.28	-.17	.28	-.25	.21	-.25	---	3.69
Total												63.05

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Analysis B: Factor 1 labeled generalized school anxiety was interpretable as a dimension of anxiety about school, experienced in situations remote from school. Factor 8 was similarly interpretable, but apparently became a separate factor due to the connotation "home" included in some of the items. Only a single item from factor 8 was included with the items selected for this subtest from factor 1. The correlation between scores for factors 1 and 8 was .40.

Items for factors 3 and 9 were combined into a single index of parental pressure for achievement (the correlation between scores for factors 3 and 9 is .23). In contrast to the other subtests, items for this subtest had generally low loadings on the first general factor in the principal components analysis. It would appear that this factor may be appropriately thought of as measuring a source for anxiety about school achievement experienced both in the home and at school.

As in the first stage of the development of the SAS, items indicative of general emotionality loaded consistently and highly on a single factor. The five items selected for this subtest are about equally divided with respect to lack of control over the expression of anger and anxiety. The generality of the characteristic measured by the items is thus limited to expression of these two types of emotion.

The final subtest, teacher anxiety, is one of the largest obtained in the course of the development of the SAS. Factors 2 (fear of teacher punishment for transgressions) and 5 (anxiety experienced as a function of negative teacher comments) combined in this subtest were clearly interpretable. The remaining factors (6, 7) could not be easily identified in terms of a specific label. Correlations among scores for the four factors were generally low; ignoring signs,  $r$ s ranged from .02 to .23. Although not statistically homogeneous, the items and factors combined in this subtest appear logically homogeneous in that they refer indirectly to anxiety and concern experienced as a function of the teacher-pupil relationship. Future research may indicate the desirability of forming specific anxiety subtests related to anxiety experienced in the teacher-pupil relationship.



Table 51  
 Analysis B: Varimax Factor Loadings and Item Composition  
 of Anxiety Subtests in the Final Form of the SAS<sup>1</sup>  
 (N = 230)

		<u>Factor</u>	
		<u>1</u>	<u>8</u>
<u>Subtest</u>			
<u>Analysis</u>	<u>B</u>		
	IV		
	Generalized School Anxiety	.42	
	1. I worry about school more than others		
	I know.....		
	I am at home and working on my math		
	2. When I am at home and working on my math		.68
	lesson for the next day, I often worry		
	about getting the answers wrong when my		
	teacher calls on me.....	.59	
	3. When I am on my way to school, I often		
	worry that I may have a test that day....	.85	
	4. I have often worried at night that I		
	did poorly on a test.....	.42	
	5. When I am sick and miss school, I worry		
	a lot that I will do poorly when I return		
	6. When I am in bed at night, I worry about	.51	
	how I am going to do in class the next		
	day.....	3	2
	Parental Pressure for Achievement		
	V. Parental Pressure for Achievement		
	1. My parents usually spend quite a lot of		
	time looking over and discussing my report		.55
	card in my presence.....		
	(continued on next page)		

[illegible]

Table 51  
(Continued from Previous Page)

Analysis	Subtest	Factor		
		2	5	7
B	VII Teacher Anxiety			
	1. I would be very upset if a teacher called me untidy, careless, or inattentive.....		.47	
	2. My teachers are always asking me questions just to make me nervous.....			.70
	3. I make sure that I pay attention in class so that I don't get into trouble.....	.59		
	4. I would be very concerned if I were late for class.....	.41		
	5. It bothers me a lot to be criticized by my teacher.....		.65	
	6. I make sure I do everything my teacher tells me.....	.84		
	7. Teachers should praise students more often than they do.....			.76
	8. When a teacher says she is going to find out how much I know, my heart begins beating faster.....			.45
	9. When a teacher gets made at someone else, it gets me excited and nervous.....			.53
	10. If I were caught doing wrong in school it would make me sick.....		.60	
	11. My teachers don't really understand me...			.35
	12. My teachers admire and trust me most of the time.....	.66		

<sup>1</sup>Items selected for inclusion in the final form of the SAS are represented in the table. Rejected items and items with low loadings on the factors have been eliminated in the table.

Table 52  
Inter correlations of Varimax Factor Scores  
for Nine Factors in Analysis B  
(N = 230)

	Factors									Factor Vari- ances (%)
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	
1	--									11.40
2	.12	--								8.17
3	.22	-.15	--							6.93
4	.21	-.20	.17	--						7.47
5	.43	.13	.13	.19	--					5.71
6	.15	.23	.22	.24	.05	--				4.90
7	.33	-.02	.14	.20	.26	.19	--			4.61
8	.40	.04	.11	.19	.35	.14	.31	--		4.68
9	.04	.05	.23	.00	-.03	.00	.04	.03	--	4.05
Total										55.92

#### Construct Validity of the SAS

The inclusion of a large number of variables in the experimental year of the research made it possible to accomplish a limited evaluation of the construct validity of the SAS. Of necessity, the data for this evaluation consisted primarily of correlations of the anxiety subscores with academic test criteria and with the other measures of personality constructed for use in the research. Concurrent with the administration of these scales, ratings of student anxiety were obtained from the teachers who participated in the experimental year of the research. With certain qualification, it was expected that the anxiety subtests would correlate significantly with academic test criteria and certain personality variables as indicated below:

1. Negatively with achievement and intelligence (Sarason et al. (54)).
2. Positively with sex (Sarason et al., (54)).<sup>1</sup>

<sup>1</sup> Sex was scored 1 for boys and 2 for girls. The expectation was that girls would obtain higher anxiety scores.



3. Negatively with the tendency to lie or be defensive (Hill (32)).<sup>1</sup>
4. Negatively with creativity (Ruebush (52)).
5. Negatively with exhibitionism (Jones (33)).

A positive correlation was expected between anxiety and compulsivity (Grimes and Allinsmith (24)). However, specific predictions were not made for each of the compulsivity subscales.

Table 53 shows the intercorrelations among the anxiety scores. Conceptual independence of the subtests is supported by the generally less than moderate correlations among the anxiety subtest scores. The one exception to this is the moderately high correlations between test anxiety and generalized school anxiety. This may be attributable in part to the fact that these subscales have two items in common.

Table 53  
Intercorrelations of Anxiety Scores  
(N = 1000)<sup>1</sup>

<u>Test</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
1. General Emotionality	--							
2. Generalized School Anxiety	.24	--						
3. General Classroom Anxiety	.38	.48	--					
4. Peer Anxiety	.29	.32	.41	--				
5. Parental Pressure Achievement	.04	.20	.21	.04	--			
6. Teacher Anxiety	.17	.40	.32	.27	.13	--		
7. Test Anxiety	.24	.68	.50	.27	.23	.40	--	
8. Total Anxiety Score	.50	.72	.81	.56	.40	.61	.78	--

<sup>1</sup>Combined programed and experimental Ss.

<sup>1</sup>A short lie or defensive scale (eight items) was included in the research.

Table 54 presents the correlations of the anxiety scores with four measures of achievement, separately for programed and conventional Ss. In general, these data show that those subtests which purportedly measure anxiety associated directly or indirectly with the school situation (Generalized School Anxiety, General Classroom Anxiety, Parental Pressure for Achievement, and Test Anxiety) were correlated significantly and negatively with recall, transfer, and total criterion. The one exception on this is teacher anxiety, which was generally uncorrelated with achievement in either condition. The general emotionality and peer anxiety subscores, which are not specific to the academic achievement situation, were generally uncorrelated with the achievement criteria for students in both conditions.

Table 54

Correlations of Anxiety Scores with Four Achievement Scores for Ss in the Programed and Conventional Conditions<sup>1</sup>

<u>Conventional Condition</u>	<u>Recall</u>	<u>Trans-fer</u>	<u>Hypotheses Making</u>	<u>Total</u>
General Emotionality	-.04	-.02	-.04	-.04
Generalized School Anxiety	-.14**	-.17**	-.01	-.19**
General Classroom Anxiety	-.21**	-.20**	-.07	-.23**
Peer Anxiety	-.03	-.05	-.01	-.04
Parental Pressure for Achievement	-.16**	-.10*	-.11**	-.17
Teacher Anxiety	-.06	-.09*	-.03	-.08
Test Anxiety	-.13**	-.18**	-.09*	-.18**
Total Anxiety	-.19**	-.19**	-.10*	-.22**
<u>Programed Condition</u>				
General Emotionality	-.06	-.09*	-.08	-.10*
Generalized School Anxiety	-.13**	-.16**	-.05	-.16**
General Classroom Anxiety	-.16**	-.15**	-.08	-.18**
Peer Anxiety	-.08	-.07	-.01	-.08
Parental Pressure for Achievement	-.15**	-.10*	-.09*	-.15**
Teacher Anxiety	-.07	-.10*	-.02	-.08
Test Anxiety	-.15**	-.20**	-.04	-.18**
Total Anxiety	-.19**	-.19**	-.08	-.21**

<sup>1</sup>N = 500 in each condition.

\* p < .05 (one-tail).

\*\* p < .01 (one-tail).

Table 55 presents correlations of the anxiety scores with sex, teachers' anxiety rankings, mental age, the lie scale, the various scores for creativity and compulsivity and the exhibitionism scale. It may be seen that these data are generally consistent with the expectations outlined above. Girls showed a slight tendency to report more anxiety as evidenced by the significant positive correlations of sex with five of the eight anxiety scores. The anxiety subscales correlated consistently in the negative direction with mental age; with the generalized school anxiety, general classroom anxiety, parental pressure for achievement, test anxiety, and total anxiety correlations attaining significance. With the exception of parental pressure for achievement, each of the anxiety subscales correlated significantly with several of the compulsivity subscales. Consistencies in the direction of the correlations of general emotionality, generalized school anxiety, general classroom anxiety, test anxiety and total anxiety with the compulsivity subscores indicate that the high anxious student tended to be lower on meticulousness and drive to finish, but higher on intolerance of indefiniteness, cautiousness, uncomfortableness in social relations, and paralyzed initiative. As a tentative generalization, it appears that the high anxious student tended to score higher on the subscales measuring the unconstructive aspects of compulsivity and lower on the constructive subscales. This pattern seems to be in accord with clinical characterizations (Sarason et al. (54)) which suggest that, under stress, the anxious child tends to be rigid, constricted, and ineffective in his defenses against anxiety.

Further consistencies with the expectations outlined above may be noted in the case of the significant negative correlations of general emotionality, general classroom anxiety, peer anxiety, and total anxiety with the lie scale, and generalized school anxiety, peer anxiety, teacher anxiety, and total anxiety with exhibitionism. Failure to confirm expectations may be noted in the following instances:

- 1) The anxiety subscores did not correlate significantly with any of the creativity scores.
- 2) Teacher anxiety scores were generally uncorrelated with academic test criteria, and in contrast to the other anxiety subscores, correlated positively and significantly with both the constructive and unconstructive subscores for compulsivity.
- 3) The anxiety subscores failed to correlate significantly with teachers' ratings of student anxiety.

Table 55  
Correlations of Anxiety Scores  
with Selected Independent Variables  
(Ns: 731-1041)

	1 Sex	2 Teachers' Anxiety Ratings	3 Mental Age	4 Meticulousness <sup>c</sup>	5 Drive to Finish <sup>c</sup>	6 Intolerance of Indefiniteness <sup>u</sup>	7 Cautiousness <sup>c</sup>	8 Uncomfortableness in Social <sup>u</sup> Relations	9 Intolerance of Incompleteness <sup>c</sup>
General Emotion- ality	.09*	-.01	-.02	-.12**	-.17**	.18**	.01	.13**	-.08
General- ized School Anxiety	.12**	.02	-.18++	.09*	.06	.21	.18**	.18**	.03
General Class- room Anxiety	.06	.02	-.17++	-.17**	-.20**	.23**	.02	.24**	-.13**
Peer Anxiety	.01	-.06	-.05	.02	.00	.21**	.12**	.27**	.00
Parental Pressure for Achieve- ment	-.15**	.11	-.11++	-.04	-.02	.05	.00	.03	.03
Teacher Anxiety	.16**	-.06	-.06	.21**	.14*	.23**	.27**	.25**	.14**
Test Anxiety	.24**	.06	-.23++	.08	.02	.20**	.15**	.14**	.03
Total Anxiety	.13**	.03	-.20++	.00	-.05	.30**	.17**	.29**	-.01

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Table 55  
(Continued from Previous Page)

	Paralyzed <sup>u</sup> Initiative	Lie Scale	Total Compulsivity	Imagination	Flexibility	Originality	Fluency	Total Creativity	Exhibitionism
	10	11	12	13	14	15	16	17	18
General Emotion-ality	.31**	-.21++	.03	.02	-.02	-.01	-.06	-.02	-.06
General-ized School Anxiety	.26**	-.01	.26**	-.04	.04	.04	-.04	-.02	-.11*
General Class-room Anxiety	.38**	-.18++	.06	.01	.01	-.06	-.03	-.03	-.05
Peer Anxiety	.29**	-.09+	.24**	-.00	.01	-.03	-.03	-.02	-.26**
Parental Pressure for Achievement	.07	-.01	.03	-.03	.11	-.01	.01	.03	.06
Teacher Anxiety	.19**	.10	.37**	.01	-.02	-.02	-.03	-.02	-.13*
Test Anxiety	.33**	-.04	.24**	-.07	.03	-.03	-.04	-.04	-.07
Total Anxiety	.42**	-.11++	.27**	-.02	.04	-.05	-.05	-.03	-.13*

\*p < .05 (two-tailed).

\*\*p < .01 (two-tailed).

+p < .05 (one-tailed).

++p < .01 (one-tailed).

<sup>c</sup>Constructive compulsivity.

<sup>u</sup>Unconstructive compulsivity.

## APPENDIX F

### DEVELOPMENT OF THE INSTRUCTIONAL MATERIALS FOR THE PROGRAMED AND CONVENTIONAL TEACHING SITUATIONS

This appendix is divided into two major sections, the first of which presents a summary of the development, format, contents, and objectives of the programed lessons. The second section presents similar information concerning the conventional lesson plans and materials. This information is intended to provide the reader with details of the conventional and programed learning conditions not provided in the description of the experimental procedures presented in Section 2 of the report. An example of a lesson used in each of the instructional conditions is provided at the end of this appendix.

#### Development of the Improving Reading Vocabulary Program

The original version of the Improving Reading Vocabulary (IRV) program used in the research was developed by Professor Glock and Fred Shepman of Cornell. Subsequently, the program was used in a doctoral study by Walther (69). For use in the present study, the program was further refined in two stages during the pilot year of the research. The first stage involved validating and revising the program on the basis of a trial with six eighth graders. In the second stage, the program was field tested on a large sample of eighth graders and then further revised.

The final version of the program used in the present study consisted of ten lessons, each requiring roughly 30 to 40 minutes for completion. The program was written in a style called conversational chaining, and required the student to construct one or more responses at intervals throughout each lesson. Individual lessons in the program consist of about 30 pages of material printed on five- by eight-inch paper. Lessons were presented in a cardboard holder with a sliding answer panel used for exposing the correct response.

In each lesson, the student is first introduced to one or more word elements. Within the context of interesting material, the student is led to respond with the appropriate meanings of the word elements and one or more words which contain the word element. The reverse process is also used. The conclusion of each lesson includes a review of the words and word elements taught in the lesson.

Table 56 shows the range and median number of words per frame (number of words between responses) for the ten lessons of the IRV program. These data indicate that individual frames tended to be quite lengthy. This is due to the fact that the lessons contained a considerable amount of story material designed to maintain student interest. The total number of frames was roughly equivalent across lessons with the exception of lessons one and three. Lesson One was devoted largely to introducing the student to the method of learning involved in programmed instruction and to introducing the student to the objectives of the IRV program. Lesson three contained more story material and required fewer responses than the remaining lessons.

Table 56  
Range and Median Number of Words Per Frame  
in the Ten Lessons of the IRV Program

<u>Lesson</u>	<u>Number Frames</u>	<u>Words Per Frame</u>	
		<u>Range<sup>a</sup></u>	<u>Median</u>
1	29	7-- 94	35
2	80	1--112	16
3	42	5--130	27
4	69	3-- 75	21
5	66	3--109	19
6	79	1-- 97	23
7	71	1-- 97	18
8	79	1-- 72	17
9	75	2-- 79	19
10	84	1-- 85	14

<sup>a</sup>In some lessons the first word or one of the first few words in the frame is a response and is followed by an additional response. This accounts for the instances of relatively few words (one to five) at the lower end of the range of words per frame.

#### Objectives of the IRV Program

The general objective of the IRV program was to develop better comprehension skills in reading by increasing the vocabulary of the pupil. At a second level of generality, the IRV program had the following objectives ("Upon completion of the program, the student should . . ."):

- (a) . . . know the prescribed definitions of 24 word elements (affixes and roots)
- (b) . . . know the prescribed definitions of 115 words, each of which contained a word element taught in the program
- (c) . . . demonstrate ability to use a simple procedure for breaking a word into its elements
- (d) . . . be capable of identifying clues pertinent to the meaning of an unknown word element when the definition of the remaining word part (element) is known
- (e) . . . be able to generate or select an hypothesis defining the meaning of the unknown word element on the basis of context clues and knowledge of the known word element
- (f) . . . demonstrate evidence of the ability to organize the results of this process (c, d, and e above) into a logical written unit for the answer sheet.

The above list indicates that the program (and conventional teaching condition) had as its objectives the teaching of meanings of word parts and words containing the word parts. In addition to this, a somewhat higher level skill developed through the instruction involved ascertaining from the context of written material the total meaning of a word containing one of the taught word elements. The objectives also included some more complex elaborations on this last theme.<sup>1</sup> Tables 57 and 58 below, contain, respectively, a list of the 24 word elements and the 115 words taught in the IRV program and in the conventional teaching condition.

#### Procedures Used in the Development of the IRV Program

A revised version of the IRV program developed by Glock and Shepman was tried out with six eighth graders, three average and three above average in IQ. These students read through and

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<sup>1</sup>See, for example, item types 11, 12, 15 and 20 given in Table 65 in Appendix G which presents a description of the development of the criterion test.



Table 57

List of the Twenty-Four Word Elements Taught in the IRV Program  
and in the Conventional Teaching Condition

<u>Lesson</u>	<u>Word Element</u>	<u>Meaning</u>
1 . . . . .	Bi-	two
2 . . . . .	Bio-	life, living things
	Neuro-	nerve
	Pneumo-	lung
3 . . . . .	Anthropo-	man
4 . . . . .	Biblio-	book
	Phil-	love
5 . . . . .	Auto-	self
6 . . . . .	Mono-	one, single
	Uni-	one, single
7 . . . . .	Centri- (centro-)	center
	Penta-	five
	Photo-	light
8 . . . . .	Micro-	very small
	Pan-	all
	Pseudo-	false or pretended
	Tele-	distant
9 . . . . .	Homo-	same
	Hetero- (heter-)	other or different
	Hydro-	water
	Phono-	voice, sound
10 . . . . .	Poly-	much, many
	Proto-	first
	Iso-	equal

responded to each of the lessons and then made detailed comments in subsequent discussion periods concerning level of difficulty, clarity, and interest level of the frames and lessons in the program. These qualitative responses were recorded, as were the number and percentage of errors per frame and lesson made by the six students. On the basis of these qualitative and quantitative data, the program was extensively revised and reprinted for use in a field trial.<sup>1</sup> It should be noted that the program had previously been refined in field trials under the direction of Glock and Shepman.

<sup>1</sup>The investigators are indebted to Mrs. Ellie Macklin who contributed substantially to this stage of program revision.

Table 58

Words Taught in the IRV Program  
and in the Conventional Teaching Condition

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anthropocentric	homochromatic	philanthropic
anthropography	homogeneous	philatelic
anthropoid	hydraulic	philharmonic
anthropologist	hydrocephalic	philodendron
anthropology	hydroelectric	philosopher
anthropometry	hydrophobia	philosophical
anthropomorphic	hydroplane	philosophy
anthropophagy	isocracy	phonics
autobiography	isosceles	photo-sensitive
autocracy	isotherms	photo-synthesis
autocrat	microbes	photo-tropic
autocratic	microbiology	pneumococcus
autograph	microfilm	pneumectomy
autohypnosis	microorganisms	pneumonia
automat	microscope	polyandry
automatic	monarch	pologamy
automation	monarchy	polyglot
automaton	monochromatic	polygon
automobile	monocle	polygyny
autonomous	monologue	polysyllabic
autonomy	monomania	protoplasm
autopsy	monopoly	prototype
bibliographer	monotheism	protozoa
bibliography	monotone	pseudonym
bibliophile	monotonous	symphony
bibliopole	monotony	telemeter
biochemistry	neuralgia	telepathy
biology	neurectomy	telescope
biophysics	neuritis	unicameral
biopsy	neurologist	uniform
cacophony	neurology	union
centrifugal	neurosurgeon	unilateral
centrifuge	panacea	unique
centripetal	pandemonium	universal
centrist	panorama	universe
concentric	pantheon	
dehydrated	pantomime	
euphony	pentagon	
heterogeneous	pentameter	
	pentathlon	
	pentogram	

---

---

A program holder with a sliding answer panel was designed and manufactured for use in the field trial of the IRV program. Roughly 3,000 eighth graders in ten different schools were administered the program with the new holder, mimeographed answered sheets for recording responses, and one form of the criterion test given at the conclusion of the ten lessons. The procedures for administration of the program were the same as those described in the text (see Section 2).

A random sample of 100 sets of answer sheets was drawn from the population of 3,000 sets. The average number of errors per 100 students was calculated for each frame and lesson. The average per cent of errors per lesson is given in Table 59. These data show that the average per cent of incorrect responses per lesson ranged from 3 per cent to 13 per cent. The average per cent of errors per lesson was below 10 per cent for nine of the lessons, whereas Lesson Three exceeded this generally recognized criterion by only 3 per cent. Figures for the per cent of students who made errors on each of the individual frames in the ten lessons indicated that in no case did the per cent error on individual frames exceed 15.

Table 59  
Average Per Cent of Errors Per Lesson  
for the IRV Program

<u>Lesson Number</u>	<u>Per Cent Error Per Student</u>
1	5
2	6
3	13
4	4
5	5
6	6
7	4
8	3
9	3
10	4

<sup>a</sup>Based on a random selection of 100 students who completed the program during the pilot year of the research. The total pilot sample exceeded 3,000.

The opinions of the participating teachers with respect to the reactions of their students to the IRV program were solicited and used as an additional source of evaluation. In general, teacher reaction to the program was very favorable. Students regarded the stories or context of the program as interesting and the learning of the words, word elements, and procedures for analyzing words as challenging and worthwhile. Analysis of criterion test performance indicated that the program accomplished the objectives. That is, students could generally recall the meanings of the word elements and words taught in the program and could apply the method of word analysis taught in the program. On the basis of these data and the quantitative data on error rate, it was decided that the program could be used without change during the experimental year of the research. The program holder also proved adequate for the purposes of the study.

### The Conventional Teaching Condition

The teacher-student interaction, which derived in large part from a lesson guide and supplementary materials provided to each of the conventional teachers, constituted the conventional teaching situation. Roughly two weeks before beginning the study, teachers in the conventional condition were provided with a 94-page lesson guide which detailed the important experimental contingencies of the conventional teaching condition, presented the contents and objectives of the lessons, and outlined methods suggested for teaching. The lesson guide, together with the supplementary materials, were prepared by project staff with the intent of accomplishing the same objectives as those indicated for the programmed instructional condition. These materials and the procedures recommended for using them are described below. A complete lesson taken from the lesson guide is included at the end of this appendix.

### Organization of the Lessons

Table 60 presents an overall view of the word elements and methods of teaching the contents of each lesson. The second column from the left lists the word elements for a given lesson; the middle column shows the lesson parts or structural elements common to each lesson; and the last column presents the general method or technique used in teaching the content of each lesson. This last column illustrates the variety of techniques selected



Table 60  
Structure of the Ten IRV Lessons

Lesson	Word Elements	Repetitive Lesson Parts	Teaching Method
1	Bi-	Introduction Summary	Discussion Word Game
2	Bio- Neuro- Pneumo	Introduction Summary Test	Discussion
3	Anthrop-	Review Introduction Summary Test	Taped Interview Discussion Written Practice
4	Biblio- Phil-	Review Introduction Summary Test	Dictionary Practice Discussion
5	Auto-	Review Introduction Summary Test	Narrative Discussion Written Practice
6	Mono- Uni-	Review Introduction Summary Test	Discussion Written Practice
7	Centri- Penta- Photo-	Review Introduction Summary Test	Narrative Dictionary Exercise Discussion
8	Micro- Pan- Pseudo- Tele-	Review Introduction Summary Test	Discussion Slide Exercise
9	Homo- Hetero- Hydro- Phono	Review Introduction Summary Test	Narrative Discussion
10	Poly- Proto- Iso-	Review Introduction Summary Test	Narrative Discussion Review of Test

to accomplish the objectives of the lessons. For example, Lesson III employed a tape recording of a 15-minute interview with a "famous anthropologist" (a staff member who agreed to the pose). Three lessons contained original stories written especially for the unit. Lesson VII approached the teaching of words and word elements through a series of slides. The slide part of this lesson was a guessing game in which the student attempted to determine word and word-element meanings represented in the illustrations given in the slides.

Each of the ten lessons was divided into parts given in order under the following titles: objectives, review, introduction, lesson body, practice, summary of review, and test.

The objectives comprised a list of the word parts and words to be taught in the lesson.

The review was designed as a short corrective session of the errors made in the immediately preceding lesson. Based on a tabulation of the frequency of errors made from a test given at the conclusion of the previous day's lesson, the teacher designed a three- to five-minute review to correct any discrepancies from accomplishment of the behavioral objectives of the lesson. A chart, Frequency Tabulation of Errors was included at the end of Lessons II-IX for the purpose of ascertaining the most frequent errors of response. The review section of the lesson was optional depending upon the element of time, and the extensiveness of the response errors of students indicated by the test.

The introduction was included in each lesson and was designed to create a set for the student. It was written to increase interest-derived motivation and to indicate to the student the learning objectives of the lesson.

The lesson body was the most important part of the lesson. An example of the format of the lesson body is presented and discussed below:

#### Lesson Body

<u>Class Response</u>	<u>Teacher Method</u>
1. <u>Pneumonia</u> means a disease or infection of the lungs.	1. Write on the board and have the class define.
2. The word element <u>pneumo</u> means lungs.	2. Which part of the word <u>pneumonia</u> is a scientific word for lungs?

Note that the response which the student was expected to learn was given on the left, while the method (cues, key questions, etc.) for eliciting the response was presented on the right. In general, the teaching procedure was to first elicit the response to a word element in the context of a word with which the student was already familiar. When the appropriate response to the word element was thus clarified, it was then used in the context of an unknown word. In this way, the specific objectives of the lesson (responses to specific words or word elements) were gradually approached.

The teaching method column in the lesson body was designed to aid the teacher in eliciting appropriate responses at each stage of the discussion through many examples of questions, pertinent facts, and other clues, all of which indirectly approached the meanings of the word elements, word endings, and combination words. The approach may be termed "Socratic," since the teacher's role was not to give answers, but rather to structure the situation so that the correct response could be elicited from the student himself.

The left-hand column, class responses, listed the student responses (definitions or words and word elements) which were expected to be elicited in the discussion. These definitions more exactly specified the objectives listed previously in this appendix. These definitions may be thought of as the behaviors (responses) the student was expected to exhibit at the conclusion of the lesson. Accomplishment of these objectives was facilitated by requesting the teacher to use the approach given below in defining all words and word elements as they emerged from the discussion:

- (1) Write each new word or word element on the board as it is introduced;
- (2) Say each new word element or word as it is introduced and have the class repeat the pronunciation;
- (3) As the meaning of the new word or word element becomes clear in the discussion, write its definition on the board. Use the following diagram to save space:

(two) bi/cephalous (headed)

- (4) Whenever possible, have someone in the class use the new word or word element in a new context.

The practice section of the lesson provided the student with mimeographed exercises in using the words and word elements taught in the lesson.

The summary (or review) function of the lesson was largely accomplished through the written exercises and other activities which occurred before the test. In some lessons, prepared summaries were provided for the teacher but were designated as optional.

The test part of the lesson was a short objective test to be given after the summary function was completed. Tests were to be graded during the period or graded and returned the following day. Both the test and the Frequency Tabulation of Errors chart were to be used in designing the review for the following day, if it was thought necessary.

### Materials and Equipment

In addition to the lesson guide, each teacher involved in the conventional teaching condition was provided with sufficient mimeographed copies of all practice sheets, tests, stories, and the IRV Dictionary. A set of ten slides and a 15-minute tape recording were also provided with the lesson guide. The IRV Dictionary was a seven-page mimeographed dictionary which presented brief meanings and phonetic pronunciations of all words and word parts used in the lessons. It was used as a central part of two of the ten lessons and also served as a reference for the student when he was working on the practice exercises in other lessons.

### Variations in Teaching Method

Directions given to the conventional teachers both at meetings and in the lesson guide emphasized that the specific responses (definitions) to the word parts, words, and practice in finding and interpreting context clues given in the lesson body were the major elements of the lesson. It was also emphasized that the specific words and other elements of a particular lesson should be taught in that lesson and on the day indicated. Planning on the basis of the lesson plans and the contingencies of the teaching situation was to be sufficiently precise so that material to be learned in a given lesson was not carried over into the next day's lesson, except as a function of review. The teacher, however, was free to deviate from the teaching methods and approaches given in the lesson plans -- even encouraged to do so. The important point emphasized in teacher meetings and in the lesson guide was that teaching of content in the conventional condition parallel that given in the programmed condition.



IRV PROGRAMED LESSON SIX:  
The Word Elements "Mono-" and "Uni-"

You have probably come across the word monopoly (ma'na'-poe-lee) in your Social Studies or Citizenship Education courses. You will remember that it means "one person or company having the sole right to sell a particular product." Since the word ending "-poly" means "sell," one could guess that the word element "mono-" means 1. In our country it is illegal for only 2 person or company to sell a product because we believe there should be competition between sellers. We think it is unfair to the buyers for a person to have a 3 on a product because this allows the seller to charge as high a price as he wants.

1. one, single  
...
2. one  
...
3. monopoly  
.....

-----  
2.

Monocle (ma'-na-cull) is a word with which you're probably familiar. If you know it has to do with eyeglasses, then your knowledge of the word element "mono" should help you figure out that a monocle must be a glass which is used for only 4 eye. How many English movies have you seen in which a man was wearing a 5 over 6 of his eyes? There is a famous ad for men's shirts in which the model wears a 7.

4. one, a single  
.....
5. monocle  
.....
6. one  
...
7. monocle  
.....

-----  
3.

Another familiar word is monarchy (ma'-nar-kee). In this case, because "mono-" comes before a vowel in the word, the letter 8 is dropped to aid pronunciation. A monarchy is a type of government in which all the power is held by only 9 person. The person who rules over a 10 is called a king, or monarch (ma'-nark). As you will remember, an auto-cracy is also a government in which all the power is in the hands of one person. Actually a king or 11 is a type of autocrat who inherits his position from his family.

8. o  
...
9. one  
...
10. monarchy  
.....
11. monarch  
.....

4.

There are two types of monarchies in our modern world. In Saudi Arabia, the monarch has absolute power, so he is known as an absolute 12. In Denmark, on the other hand, the Congress has some control over the country, so the government is called a limited 13.

12. monarch

.....

13. monarchy

.....

5.

Some words which refer to "one or a single" thing do not use the word element "mono-". Instead, they begin with the word element "uni-". Think of such words as uniform, universe, and unicycle (you'-ni-sy-cull), for example. They might equally well be written "moniform," "monoverse" and "monocycle," and mean the same thing. Why should the English language have two word elements which mean exactly the same thing? There is no logical reason. It is simply due to the fact that through the years some words have come to be written with "mono-" and some with "uni-," meaning 14.

14. one, single

.....

6.

One of the most common uses of the element "uni-" is in the word union. For example, the United States is sometimes called the Union, and of course you know a lot about labor unions. In the case of the United States, the word union refers to the fact that all 50 states have been joined together or united into 15 government. When the workers of a company unite so that they can bargain with the company as 16 group, we say they have formed a labor 17.

15. one, a single

.....

16. one, a single

.....

17. union

.....

7.

A word which has been much in the news in recent years is unilateral (you'-no-lat'-er'al). Many people have proposed that, whether or not Russia stops testing atomic bombs, the United States should do so, as a gesture of our love of peace. Since "-lateral" means "side, or sided," you can tell that unilateral refers to any action taken by 18 side and not the other. If the U.S. had withdrawn its warships from the sea around Cuba in 1962, but Russia had not withdrawn her troops and missiles, this would have been a 19 action, because it would have been 20 - sided. The German invasions of Belgium during World Wars I and II were also examples of 21 actions.

18. one  
.....
19. unilateral  
.....
20. one  
.....
21. unilateral  
.....

8.

Another word which has to do with government is unicameral (you-ni-cam'-er-al). Since "-cameral" means "chamber or house," a unicameral legislature would have only 22 house. If the United States Congress had only one house we could say it was 23. Most of the states in the United States have two houses in their legislatures, just like the U.S. Congress. Nebraska, however, has only one house, so its legislature is a 24 legislature.

22. one  
.....
23. unicameral  
.....
24. unicameral  
.....

9.

Now that we've seen some of the uses of the word elements "mono-," and "uni-" let's try what you've learned on a passage of writing. The following passage describes one of the most famous of American novels, Herman Melville's MOBY DICK. Write your definition of the underlined words on the answer sheet, and then check yourself by looking under the sliding cover.

10.

"When we first meet Captain Ahab and his ship, the Pequod, they are just setting sail from Nantucket. The Pequod is a sturdy whaling vessel with a crew drawn from the four corners of the earth. On her decks, Negroes, Indians, and South Sea Islanders rub shoulders with farm boys from New Hampshire. All are drawn to the sea, hoping for the riches and adventure of whaling.

11.

"Captain Ahab remains aloof from his crew, a mysterious figure with a wooden leg, and a strange glint in his eyes. He is unique (you-neek') of his kind, for unlike  
25 other whaling captains, he does not seek the riches of a full hold of whale oil. Ahab's voyage is dominated by a desire for vengeance, for he seeks to find the great white whale, called Moby Dick, who on an earlier voyage wounded him and caused the removal of his leg.

25. the only one,  
the sole one.  
.....

12.

"Ahab is the ship's autocrat, the monarch of the Pequod. It is the tradition of the sea that the ship's captain be the highest authority for his men. No matter where the ship might sail, the captain's rule is universal. Because of this, the crew is  
26 doomed to help Captain Ahab fulfill his single insane desire to find and kill Moby Dick. For the time being, however, Ahab keeps his monomania (ma-no-may'-nee-a) a secret from  
27 the crew, and the voyage progresses normally.

26. existing  
everywhere,  
in all places  
.....

27. madness, in-  
sanity, crazy-  
ness about one  
thing; think  
only of one  
thing  
.....



13.

"After a time, the long, boring days at sea begin to tell on the crew. They begin to be irritated by the monotony of the voyage. The normal noises <sup>28</sup> on board the ship seem to fuse into one familiar sound. The crew waits expectantly for the monotone to be broken by the breathless <sup>29</sup> cry from up high on the mast, 'Thar she blows!'"

28. repetition  
of the same  
routine or  
tasks, a boring  
routine  
.....  
29. a single, un-  
changing sound  
or tone  
.....

-----  
14.

"At last, the day arrives. A school of whales is sighted, chased and killed. The crew works late into the night, reaping the riches of the sea, as whale after whale is brought alongside the Pequod, cut open, and relieved of its rich store of oil. After a number of such catches, the hold is filled and the crew is ready to head for home. But Ahab, obsessed with the passion of his quest, gives the order to sail on. The Pequod criss-crosses the oceans in search of his enemy, the great white whale.

-----  
15.

"Finally Ahab assembles the crew and delivers a long speech telling them (and us, the readers) why he so badly wants to kill Moby Dick. In his great monologue (ma-no-log) he reasons aloud and <sup>30</sup> reveals his motives. For him, Moby Dick's color, white, is a symbol. He thinks this monochromatic (ma-no-crow-mat'-ic) brute <sup>31</sup> is colored white merely as a disguise to fool people into thinking he is harmless, even friendly. Ahab believes that Moby Dick is really the symbol of all the evil that exists in the whole universe. He is convinced that he must be the <sup>32</sup> one to kill the whale, but he needs the help of the crew. He wants them all to think as he does, and tries to persuade them to have a uniform purpose in this mission. <sup>33</sup>

30. speech or  
talk given by  
only one person  
.....  
31. of a single  
color  
.....  
32. every single  
thing that  
exists; all  
things con-  
sidered as one  
whole  
.....  
33. having one  
form or shape;  
all the same  
single thing  
or idea  
.....

16.

"Ahab believes that there are really two Gods, one which is all good, and one which is all evil. As you can see, this contradicts the Christian idea of monotheism (ma'-no-thee-is-um). Ahab <sup>34</sup> thinks that, just as a saintly person or a beautiful religious statue might represent a good God, Moby Dick is the earthly symbol of an evil God. Therefore, Ahab and his crew must try to destroy the whale. When he has finished speaking, he has so moved the crew that his thirst for vengeance has become theirs as well.

34. one god (or  
even better)  
the belief  
that there  
is only one  
god

.....

-----  
17.

"Now all are eager for the meeting with the great white whale. The attempt to kill Moby Dick turns into a horrible battle. Captain Ahab, who has insisted on throwing the death-dealing harpoon, becomes tangled in the rope attached to it, and is dragged to the watery depths of his enemy. When all is over, only one man lives to tell the tale. Does Moby Dick represent absolute evil, or is he merely an unusually strong and clever whale? If you read the book, perhaps you will be able to decide, for the author leaves the decision completely up to you."

-----  
18.

The words you encountered in the preceding passage were unique, universal, monomania, monotony, monotone, monologue, monochromatic, universe, uniform, and monotheism. Were you able to guess the meaning of most of them by knowing the the word elements and looking carefully at the context? To be sure you understand them, let's review them.

19.

If you had a singing voice unlike anyone else's, we could call your voice unique (you-neek'). If you're a girl, and you bought a Paris original for your singing debut, that dress would also be 35, because you could be sure no one had a dress exactly like it. On the other hand, if every girl in the room were wearing a dress the same as yours, then these dresses would be uniform.

35. unique  
.....

20.

You should remember from the passage you read that the word meaning "all being alike or the same" is 36. We use this word in a special way when we talk about the clothes or members of the armed forces. For example, because all soldiers wear one kind of clothes, we say that they are wearing a 37. Since no soldier has a different-looking uniform from any other soldier, his clothes are certainly not 38!

36. uniform  
.....

37. uniform  
.....

38. unique  
.....

21.

Knowing that "mono-" means 39, you can easily determine what the word monotone (ma'-na-tone) means. Anyone who speaks in a monotone uses only a single 40 of voice. Let's hope that none of your acquaintances speaks in a 41, but if they do, you know how hard it is to listen to them very long. I once attended a lecture at which the speaker not only spoke in a monotone, but his subject itself was boring! It was a pretty monotonous (ma'-na-ton-us) lecture.

39. one, single  
.....

40. tone  
.....

41. monotone  
.....

22.

Notice that the adjective monotonous refers to more than just tone of voice. It means anything that repeats over and over again until it becomes dull and boring. If you had a job at which you did only 42 thing over and over again, you would probably say it was a 43 job.

42. one, a single  
.....  
43. monotonous  
.....

23.

The noun form of monotonous, is monotony (ma-na'-tone-ee), which refers to the repeating of one thing, like a task or a song, until it becomes boring. The crew of the Pequod became irritated by the routine of ship-board life because of the 44. During the long days on Ahab's ship, the same sounds were repeated so much that they became a monotone. This added to the already boring 45 of life on an ocean vessel.

44. monotony  
.....  
45. monotony  
.....

24.

All human beings need variety in their lives. It seems that none of us can stand 46 very long. Scientists have proved this by putting people in dark, sound-proof rooms, where they were to spend the time lying on a bed. Because of the 47 conditions, they soon began to have distortion of their vision and to see things that weren't there. Although they were paid \$20 a day and all their physical needs were cared for, most people could not take such a 48 routine for more than two or three days.

46. monotony  
.....  
47. monotonous  
.....  
48. monotonous  
.....



25.

All of us probably know someone who only seems to care about one thing, such as baseball or building radios. Usually this is just a strong interest. In some cases, however, the interest grows so strong that the person can do nothing else. The person who has an unhealthy concern for one thing is said to have monomania (ma-no-may'-knee-a). Because Napoleon cared only for conquering other countries, some say this was his 49. Captain Ahab's insane desire to kill Moby Dick is a case of 50.

49. monomania

.....

50. monomania

.....

26.

We first learned of Captain Ahab's monomania in his dramatic speech to the crew. Since he was the only person to speak, we say he delivered a monologue (ma'-no-log). Hamlet gives a famous 51 in Shakespeare's play. Often when an author has a complicated situation to explain to the reader or audience, he has one of the characters explain it in a long 52.

51. monologue

.....

52. monologue

.....

27.

If you've every bought color film for a camera, you've probably noticed that the brand name always ends in "-chrome" (such as Kodachrome). This is because "-chrome" means color. Remembering this, you can see that monochromatic (ma-no-crow-mat'-ic) means anything which is all of 53. Because Moby Dick was completely white, he was referred to as a 54 whale. There is a hotel in Pittsburgh which is built completely of gold-colored aluminum -- it is famous because it is 55.

53. one color

.....

54. monochromatic

.....

55. monochromatic

.....

28.

Another word in the passage which was probably new to you was monotheism (ma'-no-thee-is-um). Since the word ending "-theism" means "a belief in god," it will be easy for you to remember that monotheism means "a belief in 56 god." The first country to practice 57 as a religion was Egypt, where the Sun God was worshipped. Christianity and Judaism are two modern religions based on 58. As you remember from history, the Romans, who had many gods, persecuted the early Hebrews and Christians for practicing 59.

56. One, a single  
.....  
57. monotheism  
.....  
58. monotheism  
.....  
59. monotheism  
.....

-----  
29.

I expect you thought one of the easiest words in the passage was universe. Actually, it is a little trickier than it seems, for while it refers to everything there is, at the same time it is one thing. That's why the word element "uni-" appears in the word -- it means "everything that exists, considered as one thing." The earth, the stars and planets, the galaxies -- all are included in the word 60. When we say that love of peace is universal, we mean that people everywhere are as one in agreeing with this idea. The United Nations is an organization concerned with 61 problems, because what it does affects everyone.

60. universe  
.....  
61. universal  
.....

-----  
30.

Now let's review the definitions of the words you learned in this lesson.

1. If one person or company had a sole right to sell a particular product, it would be known as having a 62 on that product.

62. monopoly  
.....

2. The person who does not vary the tone of his voice as he speaks is speaking in a 63. Anything which is repeated over and over again until it becomes boring soon becomes 64. Since most of us cannot do without some variety in our lives, it is natural for us to dislike the opposite of variety, 65.
3. An eyeglass used for only one eye is a 66.
4. A country which has one ruler who has inherited his title is known as a 67 and the ruler himself is called a 68.
- 
5. When workers form a group in order to have greater strength when bargaining with the managers of their company, the group is called a labor 69.
6. The word meaning "one sided, or action taken by only one side" is 70. If the legislature of a country or state has only one house, it is said to be a 71 legislature.
7. If you belonged to a club in which everyone wears the same type of clothes, like the Boy Scouts, we would say you wore a 72. On the other hand, if you had a new suit of clothes which was unlike anyone else's, we would describe your suit as being 73.
- 
8. The word for "an unhealthy concern about only one thing" is 74.
9. A speech or talk given by only one person is a 75.
10. Something which is entirely of one color can be described as 76.

63. monotone  
.....

64. monotonous  
.....

65. monotony  
.....

66. monocle  
.....

67. monarchy  
.....

68. monarch  
.....

69. union  
.....

70. unilateral  
.....

71. unicameral  
.....

72. uniform  
.....

73. unique  
.....

74. monomania  
.....

75. monologue  
.....

76. monochromatic  
.....

11. The practice of believing in one god alone is referred to as 77.
12. When we mean to say "everything there is, considered together as one thing," we use the word 78. When we speak of something which is the same no matter where one may go we use the word 79.

77. monotheism  
.....

78. universe  
.....

79. universal  
.....



IRV CONVENTIONAL LESSON VI:  
The Word Elements "Mono-" and "Uni-"

Objectives

1. To know the meanings and to understand the usages of the word elements mono- and uni-.
2. To know the meanings and to understand the usages of the word endings:

- |             |               |
|-------------|---------------|
| a. -poly    | i. -mania     |
| b. -ocle    | j. -tony      |
| c. -archy   | k. -tone      |
| d. -on      | l. -logue     |
| e. -lateral | m. -chromatic |
| f. -cameral | n. -verse     |
| g. -que     | o. -form      |
| h. -versal  | p. -theism    |

3. To know the meanings and to understand the usages of the complete words:

- |               |                  |
|---------------|------------------|
| a. monopoly   | i. monomania     |
| b. monocle    | j. monotony      |
| c. monarchy   | k. monotone      |
| d. union      | l. monologue     |
| e. unilateral | m. monochromatic |
| f. unicameral | n. universe      |
| g. unique     | o. uniform       |
| h. universal  | p. monotheism    |

Review

Based on the frequency tabulation of errors on the test for the previous lesson, conduct a review of the words which need further explanation. The space below is for planning this review.

Introduction: (Pass out Lesson VI - IRV Practice)

"You probably have come across many words using the word elements "mono-" and "uni-" in your social studies courses and other reading. Most of the words which appear on IRV Practice are words that you already have seen. Let's see how many of these words we already know. As we go through the lesson, write a definition for each word in the space provided on the Practice page."

Lesson Body:

Class response

Teacher method

(Note: In discussion, it is not expected words will follow order given in plan. Use class contributions for as many words as possible. Discuss unknown words later. Illustrate how one or single fits into each definition.)

1. The word elements mono- and uni- both mean one, single.
2. Monopoly means one person or company having the sole right to sell a particular product or service.
3. A monocle is a glass, or spectacle, used for only one eye.
4. A monarch is a person who rules alone through an inherited position.

1. "What general meaning is conveyed by these two word elements?"
2. Discuss the game "Mono-poly;" object of the game. Why is a monopoly illegal in the United States?
3. What are bifocals? What is an oculist?
4. Can you name someone whom you could call a monarch? Why isn't Franco, who rules Spain by himself, a monarch?

(Note: Distinguish between a monarch and an autocrat.)

5. A monarchy is a type of government in which the power is held by one person.

5. Why are Britain and Denmark called limited monarchies? Why is Saudi Arabia called an absolute monarchy?

- |  |   |
|--|---|
| <p>6. A <u>union</u> means joined into one.</p> <p>7. <u>Unilateral</u> means one-sided, an action taken by one side.</p> <p>8. <u>Unicameral</u> means a legislature of one chamber.</p> <p>9. <u>Unique</u> means the only one of its kind.</p> <p>10. <u>Uniform</u> means all of one kind.</p> <p>11. <u>Monotone</u> means single sound.</p> <p>12. <u>Monotony</u> (n.) is the repetition of one routine; boring routine. <u>Mono-tonous</u> (adjective).</p> <p>13. <u>Monomania</u> is a madness or insanity about one thing; thinking of only one thing.</p> <p>14. A <u>monologue</u> is a speech or a talk by one person.</p> <p>15. <u>Monochromatic</u> means all of one color.</p> | <p>6. Why could we say that our country is a <u>union</u>? What is a labor <u>union</u>?</p> <p>7. In the game of football, what is a <u>lateral</u> pass? What would a <u>unilateral</u> action in world affairs mean? Give examples of <u>unilateral</u> actions.</p> <p>8. What is meant by <u>bi-cameral</u>? Nebraska is the only state having a <u>unicameral</u> legislature.</p> <p>9. There are many waterfalls; why is Niagara Falls <u>unique</u>?</p> <p>10. What is the difference between <u>unique</u> and <u>uniform</u>?</p> <p>11. Illustrate by speaking in a monotone. Why is it not possible to sing in a monotone.</p> <p>12. Related to <u>monotone</u>, but has extended its meaning. In "The Promised Land," (Lesson V) Jake hypnotized himself into believing he was doing something pleasant while he worked. Why?</p> <p>13. What word do you know which looks like <u>mania</u>? What is a <u>maniac</u>?</p> <p>14. What do we mean by <u>dialogue</u>?</p> <p>15. If you ever bought color film for your camera, you probably have seen the brand name <u>Kodachrome</u>. What does <u>-chrome</u> mean?</p> |
|--|---|

16. Monotheism is the belief in one god.

16. Can you tell me what is mean by atheism?

17. Universe (n.) means everything that exists, considered as one thing. Universal (adj.) means that all peoples agree or think one way.

17. In science, we speak of the universe; what does it include? We say the U.N. is concerned with universal problems. Since it involves just a small part of the universe, why are these problems universal?

Summary:

For this rather lengthy discussion lesson, a space has been left for a summary planned by the individual teacher.

Test: Use prepared Lesson VI test. Read through directions with class. Correct in class. Save for review.

Completion:

1. unique
2. universal
3. monomania
4. monotony
5. montone

6. monologue
7. monochromatic
8. universe
9. uniform
10. monotheism

Matching:

1. d
2. g
3. f

4. c
5. a
6. h

NAME \_\_\_\_\_

DATE \_\_\_\_\_



## IRV PRACTICE - LESSON VI

Mono-: one, single

Uni-: one, single

1. monopoly -
2. monocle -
3. monarchy -
4. union -
5. unilateral -
6. unicameral -
7. unique -
8. universal -
9. monomania--
10. monotony -
11. monotone -
12. monologue -
13. monochromatic -
14. universe -
15. uniform -
16. monotheism -

NAME \_\_\_\_\_

Possible Score \_\_\_\_\_

No. wrong x 6.2 \_\_\_\_\_

DATE \_\_\_\_\_

TEST SCORE \_\_\_\_\_

## IRV TEST - LESSON VI

### Completion

Directions: The following passage describes the famous American novel, Herman Melville's MOBY DICK. Several words have been left blank. Read the story first, then place one word from the following list in the blank where the context is most appropriate to the word's meaning. Use each word one time.

monochromatic  
monologue  
monomania  
monotheism  
montone

monotony  
uniform  
unique  
universal  
universe

## MOBY DICK

When we first meet Captain Ahab and his ship, the Pequod, they are just setting sail from Nantucket. The Pequod is a sturdy whaling vessel with a crew drawn from the four corners of the earth. On her decks, Negroes, Indians, and South Sea Islanders rub shoulders with farm boys from New Hampshire. All are drawn to the sea, hoping for the riches and adventure of whaling.

Captain Ahab remains aloof from his crew, a mysterious figure with a wooden leg, and a strange glint in his eyes. He is (1) \_\_\_\_\_ for a whaling captain, for unlike other captains, he does not seek the riches of a full hold of whale oil. Ahab's voyage is dominated by a desire for vengeance, for he seeks to find the great white whale, called Moby Dick, who on an earlier voyage wounded him and caused the removal of his leg.

Ahab is the ship's autocrat, the monarch of the Pequod. It is the tradition of the sea that the ship's captain be the highest authority for his men. No matter where the ship might sail, a captain's rule is (2) \_\_\_\_\_. Because of this, the crew is doomed to help Captain Ahab fulfill his single insane desire to find and kill Moby Dick. For the time being, however, Ahab keeps his (3) \_\_\_\_\_ a secret from the crew, and the voyage progresses normally.

After a time, the long, boring days at sea begin to tell on the crew. They begin to be irritated by the (4) \_\_\_\_\_ of the voyage. The normal noises on board the ship seem to fuse into one familiar sound. The crew waits expectantly for the (5) \_\_\_\_\_ to be broken by the breathless cry from up high on the mast, "Thar she blows!"

At last, the day arrives. A school of whales is sighted, chased and killed. The crew works late into the night, reaping the riches of the sea, as whale after whale is brought alongside the Pequod, cut open, and relieved of its rich store of oil. After a number of such catches, the hold is filled and the crew is ready to head for home. But Ahab, obsessed with the passion of his quest gives the order to sail on. The Pequod crisscrosses the oceans in search of his enemy, the great white whale.

Finally Ahab assembles the crew and delivers a long speech telling them (and us, the readers) why he so badly wants to kill

Moby Dick. In his great (6) \_\_\_\_\_, he reasons aloud and reveals his motives. For him, Moby Dick's color, white, is a symbol. He thinks this (7) \_\_\_\_\_ brute is colored white merely as a disguise to fool people into thinking he is harmless, even friendly. Ahab believes that Moby Dick is really the symbol of all the evil that exists in the whole (8) \_\_\_\_\_. He is convinced that he must be the one to kill the whale, but he needs the help of the crew. He wants them all to think as he does, and tries to persuade them to have a (9) \_\_\_\_\_ purpose in this mission.

Ahab believes that there are really two Gods, one which is all good, and one which is all evil. As you can see, this contradicts the Christian idea of (10) \_\_\_\_\_. Ahab thinks that, just as a saintly person or a beautiful religious statue might represent a good God, Moby Dick is the earthly symbol of an evil God. Therefore, Ahab and his crew must try to destroy the whale. When he has finished speaking, he has so moved the crew that his thirst for vengeance has become theirs as well.

Now all are eager for the meeting with the great white whale. The attempt to kill Moby Dick turns into a horrible battle. Captain Ahab, who had insisted on throwing the death-dealing harpoon, becomes tangled in the rope attached to it, and is dragged to the watery depths of his enemy. When all is over, only one man lives to tell the tale. Does Moby Dick represent absolute evil, or is he merely an unusually clever whale? If you read the book, perhaps you will be able to decide, for the author leaves the decision completely up to you.

#### Matching:

Directions: Match each word in the column on the left to the correct definition in the column on the right by placing the letter of the definition in the blank before the word.

- |                     |  |
|---------------------|--|
| _____ 1. monopoly   | (a) power of government held by one person who inherits this right |
| _____ 2. union      | (b) allowed to sell only one product.                              |
| _____ 3. unicameral | (c) eyeglass for one eye.  |
| _____ 4. monocle    | (d) one person or company has sole right to sell a certain product |
| _____ 5. monarchy   | (e) many-sided   |
| _____ 6. unilateral | (f) one chamber of government                                      |
|                     | (g) joined into one  |
|                     | (h) one-sided  |
|                     | (i) eyeglasses with two kinds of glass                             |

## FREQUENCY TABULATION OF ERRORS FOR LESSON VI

### Completion:

<u>Question</u>	<u>Number of Errors</u>	<u>Word</u>
1.	_____	unique
2.	_____	universal
3.	_____	monomania
4.	_____	monotony
5.	_____	monotone
6.	_____	monologue
7.	_____	monochromatic
8.	_____	universe
9.	_____	uniform
10.	_____	monotheism

### Matching:

1.	_____	monopoly
2.	_____	union
3.	_____	unicameral
4.	_____	monocle
5.	_____	monarchy
6.	_____	unilateral



## APPENDIX G

### DEVELOPMENT OF THE CRITERION TEST

The development of the criterion test proceeded over three stages. In stage one, a pool of 189 items was constructed to measure the instructional objectives. The purpose of stage two was to eliminate both the very easy and very hard items and thus reduce the number of items in the original pool. Stage three involved a factor analysis of the reduced-item pool wherein four a priori subdivisions of the criterion items established at stage one were submitted to empirical verification. The resultant data were then used as a basis for the selection of items grouped by subtest and item type in the final criterion test. A copy of the final criterion test is included at the end of this appendix.

#### Stage One

The original 189 criterion items were classified into 20 item types. These, in turn, were grouped into four major a priori subdivisions: (a) items involving direct recall of the subject matter of instruction; (b) items involving transfer to new material of the procedures and knowledge learned through instruction; (c) items involving demonstration of the use of contextual clues; and (d) items involving the generation of hypotheses concerning possible meanings of words. Descriptions and samples of items by type and subdivision are given in Table 65 of this appendix.

#### Stage Two: Reducing the Size of the Item Pool

The 189 items were distributed over seven criterion test forms. These "forms" were administered in ten schools to pupils who had completed the instructional unit using the programmed materials. Each pupil was administered two of the "forms." The average number of pupils responding to an item was 371 (range 300-398).

In addition to providing data to be used in reducing the size of the item pool, this test administration had two additional purposes. First, it was necessary to obtain preliminary data concerning amount of time needed to complete items of a certain type. Secondly, it provided an opportunity to determine whether the directions for the various item types were satisfactory.

Original directions were found to be adequate and there was need for little revision.

Pupils appeared to make intelligent responses to the various item types included in the initial criterion test. With the exception of the items of type 17, representative items of the remaining types were included in the reduced item pool described below. The nine items of type 17 were eliminated without reference to item statistic data since it appeared on second thought that this item type was measuring an objective irrelevant to the instruction. An additional 77 items were eliminated from the original item pool, leaving 103 in the reduced item pool.

A number of the 77 items were eliminated because the item difficulty index seemed unusually high or low. No fixed cut-off values were used.

Other items were rejected because of majority of pupils either knew or did not know, as the case required, certain key words in the item related to a correct answer. For example, in type 10, it was assumed that pupils knew the meaning of some untaught words and/or did not know (prior to taking the question) the meaning of other untaught words. This assumption was treated as an hypothesis and tested by administering a list of these words (in lieu of the two "forms") to a randomly selected few in each classroom and by asking them to supply definitions.

The third basis for item elimination was the adequacy of sampling for an item type. If the number of items for a type was excessive when compared to the other types, one or more were deleted.

A comparison of the item difficulty levels between the 103 items which were retained and the 86 items which were rejected is shown in Table 61. It will be noted that the distribution of difficulty levels is less varied for the retained items, but not markedly so. That is, compared to the retained items, the rejected item pool contained relatively more items of high difficulty or low difficulty levels.

It was recognized that the procedure of eliminating items on the basis of item difficulties, derived from responses of only those pupils having had the programed material, might result in a spurious interaction between student characteristic and treatment on criterion score. That is, the distribution of item difficulties based on responses of pupils conventionally taught for the retained items might be more heterogeneous than

Table 61  
Distribution of Difficulty Levels  
of Original 189 Item Pool

Difficulty Level	Frequency (of Items Accepted in Reduced Item Pool)	Frequency (of Rejected Items)
90-100	0	4
80-89	2	22
70-79	16	17
60-69	21	12
50-59	20	6
40-49	18	4
30-39	13	2
20-29	5	7
10-19	1	7
0-9	1	2
Not determined <sup>a</sup>	<u>6</u>	<u>3</u>
Total	103	86

<sup>a</sup>Items not of the pass-fail type.

that distribution shown in Table 61. The more heterogeneous distribution of item difficulties, it was feared, would result in smaller variance on the criterion test and subtests for the conventional group (Ebel (15)). However, the standard deviations of the criterion subtest scores shown in Section Two, Table 7 indicate that only on the recall subtest of the final criterion test was there smaller variance for the conventional group. What little difference there was can more readily be explained by a slight ceiling effect for the conventionally treated group on this subtest. The purpose of this paragraph is to answer a possible criticism of the test development technique; namely, that rejecting items on the basis of item difficulties determined only on a programmed instruction treatment group creates a statistical artifact.

Using total score on the "form" as an internal criterion, the proportion of students passing the item in the bottom half was subtracted from the proportion of students passing the item in the top half. This discrimination index was not referred to in deciding which items to eliminate. A comparison of the distribution



of item discrimination indices for the retained and rejected items is shown in Table 62. Although the median discrimination index is slightly lower for the rejected group of items (.30 vs. .37), this is due to the greater number of very hard and very easy items in the rejected group rather than to any deliberate selection on the discrimination characteristic.

Table 62  
Distribution of Discrimination Indices  
of Original 189 Item Pool

<u>Discrimination Level</u>	<u>Frequency (of Items Accepted in Reduced Item Pool)</u>	<u>Frequency of Rejected Items</u>
50-59	6	1
40-49	29	13
30-39	43	29
20-29	12	24
10-19	4	10
0-9	2	4
Negative	1	2
Not determined <sup>a</sup>	<u>6</u>	<u>3</u>
Total	103	86
Median	37	30

<sup>a</sup>Items not of the pass-fail type.

### Stage Three: The Final Criterion Test

Students in four schools, different from those used in Stage Two, were administered the 103 items in the reduced item pool. All of these students received instruction using the programed materials. The 103 items were divided into five new "forms." Each student was administered two "forms." Since all possible pairs of "forms" were administered, and since all the items of one item type were contained within the same "form," it was possible to compute correlation coefficients between total scores on each of the 19 item types. A pupil's score on an item type was equal to the number of the items of that type which he answered correctly. The number of pupils upon which each correlation was based ranged from 79 to 98. The



results of the principal component factor analysis with varimax rotation are shown in Table 63.<sup>1</sup> The 19 item types have been reordered to aid in the interpretation of the factor analysis.

Table 63  
Factor Analysis of Scores  
on 19 Item Types of Vocabulary Criterion Measures  
(Varimax Rotation)<sup>1</sup>

Item <sup>a</sup> Type	A	B	C
3 <sup>b</sup>	.86	---	---
6 <sup>b</sup>	.79	---	---
5	.74	---	---
7	.75	---	---
8	.74	---	---
16 <sup>b</sup>	.77	---	---
1 <sup>b</sup>	.68	---	---
2	.57	.48	---
4	.74	.33	---
13 <sup>b</sup>	.71	---	.38
11 <sup>b</sup>	.55	---	---
9	.39	.64	---
14	.46	.54	.37
15	.35	.67	---
19	.61	.49	---
10 <sup>b</sup>	---	.73	---
12 <sup>b</sup>	---	.73	---
18 <sup>b</sup>	---	.68	---
20 <sup>b</sup>	---	---	.90

<sup>1</sup>Loadings less than .30 omitted.

<sup>a</sup>See Table 65 for a description of these item types.

<sup>b</sup>Retained in the final criterion test

<sup>1</sup>The reader should keep in mind that this factor analysis was based on a relatively small number of pupils, all of whom were instructed under the programed condition.

The first eight item types listed in Table 63 involve practically pure recall of learned material: the first three of word elements and the other five of taught words. The next seven item types make use of recall meanings of word elements or words together with non-taught materials (contextual clues, definitions, etc.) which are provided within the context of the item to arrive at the meanings of either new words (types 4, 13, 11, 9) or taught words (types 14, 15, 19). Item types 10, 12, 18, and 20 involve no taught words or elements. Successful performance on these item types require the ability to obtain meanings of new words from various clues in the item itself. A list of all the word elements studied and their meanings, by itself, would be of no help in answering these items. Item 20 differs from the other three types in that to receive a high score a student must generate many possible hypotheses about the meaning of a new, untaught word. A verbal fluency, divergent thinking ability would no doubt be of help here.

The above analysis suggests that the first factor measures recall (or recognition) of taught material. The student who diligently memorized all word elements and their meanings would do well on this factor. Factor two appears to involve a transfer skill; particularly to learn the meanings of new words given a context or definition of words or elements in common with the new word. Factor three seems close to factor two in this regard with the addition that the ability to generate many hypotheses is more important.

Returning to Table 63, it may be seen that the data seem to support this interpretation. With the exception of item type 2, the first 8 item types load heavily only on Factor A. As would be expected, the next seven item types load on both factors A and B. All seven of these item types have loadings of .35 or more on Factor A and .25 or more on Factor B. Item types 10, 12, 18, and 20 load, as they should, heavily on only Factor B or C and not on Factor A. The fact that item types 10, 12, and 18 don't have even moderate loadings on Factor C and that item type 20 doesn't load on Factor B might suggest that Factor C measures purely verbal fluency and divergent thinking ability quite apart from the objectives of the instructional unit. However, this does not seem to be indicated by the relatively low correlations of the subtest scores ( $r$ 's range from .15 to .25) with scores derived from this item type.

Three final criterion subtests were constructed on the basis of the results of the factor analysis. Specifically, item types having a high loading on one of the factors and negligible loadings on the other two factors tended to be retained.

Item types 1 and 11 were chosen over item types 7, 8, and 16 because the latter three types were open-ended items like 3 and 6 which had already been selected as partial measures of the first factor. Item types 1 and 11 are of the multiple-choice variety. Because much mental effort and emotional attachment were associated with the second groupings of 7 item types (see Table 63), some of these were included in the final criterion test. The four item types selected for the recall subtest seemed a reasonable compromise between optimum measurement of Factor A and a cross-section of recall-recognition type tasks and item forms. The composition of the final criterion test by item type is shown in Table 64.

Table 64  
Composition of Final Criterion Test and Subtests Test  
by Item Types

Item Type <sup>a</sup>	No. Items	Subtest
1	3	Factor A (Recall)
3	3	
6	3	
11	3	
10	3	Factor B (Transfer)
12	4	
18	6	
20	6	Factor C (Hypotheses Making)
Total	31	

<sup>a</sup>See Table 65 on subsequent pages of this appendix.

Although the Hypotheses Making subtest is composed of only six items, a total score on this subtest could range from zero to 12. This is because a student was given one-half a point for each "different" correct answer supplied for each of the 6 questions. No more than 4 answers, however, were counted for any one question.

The total score on the criterion test was a simple sum of the scores on the three subtests. The maximum possible score on the total was 37 (that is  $12 + 13 + 12$ ).

Thirty-five minutes were permitted for actual working time on the final criterion test. This proved ample time for virtually every student. It is fair to say the criterion test was unspeeded.

Forty-three items, distributed over eight item-types were selected from the 103 in the reduced item pool. Of these, 31 were retained for use in the final criterion test. The 12 items ( $43 - 31$ ) rejected were chosen primarily to avoid duplication of the word elements being questioned and to provide a representative sampling of content from the ten lessons. Two of these items were eliminated because the extraneous content in which the items were embedded was highly similar to content found in other items being retained.

Table 65

Description of Twenty Item Types  
into Which the Original Pool of 189 Items were Categorized

---

I. Recall Items

\*Type 1. The pupil selects from among four possible synonyms or definitions the correct meaning of a word that has been taught.

Example: Pandemonium means:

- a. broad-mindedness
- b. all-knowing
- c. polaphalous
- d. noisy or confused disorder

Type 2. The pupil must match the definition of a word with the word taught.

Example: Circles that have a common center point are:

- a. eccentric
- b. centripetal
- c. conceptual
- d. concentric

---

(Continued on next page)



Table 65  
(Continued from Previous Page)

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\*Type 3. The pupil is given meanings of word elements taught and he is to recall the element:

Example: What is the word element which has the meaning, man? \_\_\_\_\_

Type 4. Given meanings of two word elements that have been taught, the testee is to construct a word using the elements.

Example: Make up a word using word elements you know which fits the following words "small sound"  
\_\_\_\_\_

Type 5. Given a taught word element, define it in one or two words.

Example: Define the following word element in one or two words. Uni \_\_\_\_\_

\*Type 6. Given an untaught word, select and define the word elements that have been taught.

Example: Circle the part of the following word you were taught and write what that part means. anthroponomy \_\_\_\_\_

Type 7. The task is to define a taught word.

Example: Briefly define, isotherms. \_\_\_\_\_

Type 8. Given the meaning of a taught word, the pupil is to write the word.

Example: Write the word which is being defined by "measurement of the size and shape of man." \_\_\_\_\_

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(Continued on next page)

Table 65  
(Continued from Previous Page)

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II. Items Involving Transfer

Type 9. In this item type the meaning of the underlined untaught word must be determined from a word element that has been taught.

Example: The hydra is a small animal that  
a. has two heads  
b. lives in fresh water  
c. has one leg  
d. has lungs

Note: In the above item, the taught element is hydro.

\*Type 10. The pupil is required to determine the meaning of an untaught word by isolating and applying a common element in a known, untaught word.

Example: You know what a submarine is, but can you guess what subsume means?  
a. add to  
b. put under  
c. take away from  
d. believe in

Note: Pupils must determine the meaning of sub in submarine. They apply this information to determine the meaning of subsume.

\*Type 11. From a definition of a word that was not taught the pupil is required to match the word with the definition by using a word element that was taught.

Example: When only one source of sound is used in sound reproduction, it is said to be:

- a. panharmoni ~
- b. monaural
- c. philharmonic
- d. symphonic

Note: In the item above the taught element is mono meaning one.

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(Continued on next page)

Table 65  
(Continued from Previous Page)

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\*Type 12. Given an untaught word used correctly in a sentence with sufficient clues so that at least one of its elements can be determined, the student is to select the correct meaning of a second untaught word also used in a sentence. The second word has at least one untaught element, whose meaning has been discerned in the first sentence, in common with the first word. There are also context clues to aid in determining the meaning of the second word.

Example: Choose the correct definition of the underlined word in part (b) of each item using the part (a) sentence for clues to meanings of word elements that may prove helpful.

- (a) "The epidermis" is the outer layer of skin covering or lying upon the dermis, the inner skin layer.
- (b) Epigene rocks were exposed to the weather for many of their formative years.

Epigene means 1

1. formed on the earth's surface
2. formed by volcanic action
3. formed by glacial erosion
4. formed by the skeletons of dead animals

Note: The pupil can discern that the word element common to both epidermis and epigene is epi. The clue in sentence (a) is that epi means upon, or on the outside. Therefore, he would select choice 1 as correct, "formed on the earth's surface."

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Table 65  
(Continued from Previous Page)

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Type 13. Given an untaught word which includes taught elements, define the word.

Example: Define bibliocentric \_\_\_\_\_

Note: Both "biblio" and "centric" were taught elements. The word bibliocentric was not taught.

III. Items Involving Use of Contextual Clues

Type 14. The pupil is given a taught word which he must match with the best contextual clue to the meaning of that word.

Example: Which of the following sentences provides a good contextual clue for the word phototropic?

- a. This was the newest model camera.
- b. Balmy climates are usually rainy and sunny.
- c. Let us examine this natural chemical transformation.
- d. These plants lean in the direction of the sunshine.

Type 15. The pupil is given a taught word and he must choose the sentence using it correctly.

Example: Only one of the following sentences uses the underlined word in the correct sense. Choose the correct one.

- a. This figure has isosceles sides.
- b. All the sides of an isosceles triangle must be equal.
- c. This isosceles figure is three-dimensional.
- d. A triangle having two equal sides is isosceles.

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(Continued on next page)



Table 65  
(Continued from Previous Page)

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Type 16. Determine the correct taught word from a paragraph containing clues of this word.

Example: The Arab was marooned on the desert for days. Not a plant or spring were in sight. He felt weary and weak but kept up his search for water. He knew there was a fatal danger of becoming \_\_\_\_\_.

Note: One immediately thinks of lack of water on a desert and it was clear that no oasis was in sight. The pupil should recall the element hydro as a clue to the word taught, dehydrated.

Type 17. Given an untaught, known word the examinee must choose the sentence where it is used correctly, utilizing the contextual clues.

Example: In each of the following groups of sentences, choose the sentence in which there are critical clues that refer specifically to the underlined word.

- a. The embarrassed boy was good at running.
- b. My sister apologized for being embarrassed.
- c. The embarrassed guest always overate at meals.
- d. The embarrassed girl blushed as pink as her petticoat that was showing.

Note: This item type was not used after the first tryout.

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(Continued on next page)

Table 65  
(Continued from Previous Page)

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\*Type 18. Given a non-taught word element, a second word element with its meaning given, an underlined word in a paragraph containing both of these elements, and clues in the paragraph to the unknown element. The pupil is to select these clues.

Example: The scientist carefully gathered all of the instruments he would need for his experiment on extremely cold materials. He knew that the ordinary mercury thermometers would not function at such low temperatures so he chose a cryometer instead.

(Hint: "meter" means "measure")

Which one of the following used in the passage above would best help to get the meaning of "cryo"?

- a. experiment
- b. extremely cold materials
- c. would not function
- d. carefully gathered.

Note: This is similar to Type 14 except that "cryo" has not been taught.

Type 19: Given a taught word element, a second word element with its meaning given, an underlined word in a paragraph containing both of these elements, the pupil is to select the clues relating to the taught element.

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(Continued on next page)

Table 65  
(Continued from Previous Page)

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Example: Although some animals have one or two kinds of food in their diets, man is polyphagous. The human adult must eat many kinds of foods: animal, vegetable, even mineral, to be properly nourished. And in countries with high standards of living the variety in the human diet goes beyond nutritional needs. Housewives and restaurant owners always try to keep their menus diverse to whet the appetite of their diners.

(Hint: "phagein" means "to eat")

Which one of the following used in the passage above best helps you to get the meaning of "poly"?

- a. variety in the human diet
- b. the human adult must eat
- c. whet the appetite
- d. beyond nutritional needs

IV. Items Emphasizing the Generation of Hypotheses

\*Type 20. Given an untaught word used in a paragraph, the meaning of one of the elements of this word, the pupil is to use this information and contextual clues to determine several possible meanings of the word.

Example: Tim was extremely worried because his dog Farfle had been whining and whimpering lately. Tim decided to take the dog to the animal doctor. The doctor spent only a moment examining Farfle's head and said, "Nothing to worry about, son, it's just a case of odontalgia."

(Hint: the word element "algia" means "to be injured, or to ache")

---

\* Item types retained in the final criterion test."

## FINAL CRITERION TEST

### Part I

DIRECTIONS: Use the IBM card when answering questions in Part I of this test.

1. Pölygyny is:
  - a. the belief in many gods.
  - b. the practice of having many wives.
  - c. the custom of having more than one husband.
  - d. the same thing as polyandry.
2. An automaton is:
  - a. part of a machine.
  - b. bolt-action operated.
  - c. a person acting in a mechanical way.
  - d. a self-service restaurant.
3. Anthropomorphic means:
  - a. being in the form of a god.
  - b. thinking of non-human things as having human qualities.
  - c. having a number of ape-like characteristics.
  - d. possessing many forms.
4. The original draft of a document is a:
  - a. panical.
  - b. protocol.
  - c. telephoto.
  - d. pneuma.
5. The structural unit of the nervous system is the:
  - a. biota.
  - b. panacea.
  - c. microbe.
  - d. neuron.
6. The belief that "God is everything and all things are God" is known as:
  - a. autocracy.
  - b. polytheism.
  - c. pantheism.
  - d. monotheism.



7. You know what a submarine is, but can you guess what subsume means?
- a. Add to.
  - b. Put under.
  - c. Take away from.
  - d. Believe in.
8. Knowing what a tricycle is, can you guess what a cyclometer does?
- a. Measures circles.
  - b. Measures bird's eye distances.
  - c. Measures number of errors made.
  - d. Measures speed of moving objects.
9. You know what preview means, but can you tell what precursor means?
- a. Running up to.
  - b. Running before.
  - c. Running after.
  - d. Running beyond.

-----

10- The scientist carefully gathered all of the instruments he  
11 would need for his experiment on extremely cold materials.  
He knew that the ordinary mercury thermometers would not  
function at such low temperatures so he chose a cryometer  
instead.

(Hint: "meter" means "measure")

10. Which one of the following used in the passage above would best help you to get the meaning of "cryo"?
- a. Experiment.
  - b. Extremely cold materials.
  - c. Would not function.
  - d. Carefully gathered.
11. Which one of the following used in the passage above would best help you to get the meaning of "cryo"?
- a. Scientist.
  - b. Ordinary.
  - c. Low temperature.
  - d. So he chose.

- 12- Some people believe that man is never happier than in his  
13 antenatal state. For then, still within his mother's  
body, he receives all the warmth, food, and protection he  
needs, without even asking. Yet that luxury man enjoys  
before he is born ceases once he enters the world. And,  
even as adults, there are times when we all wish we could  
go back to that time before birth when we were completely  
taken care of.

(Hint: "natal" means "birth")

12. Which one of the following used in the passage above would  
best help you to get the meaning of "ante"?
- a. Still within.
  - b. Warmth, food, and protection.
  - c. Luxury man enjoys.
  - d. There are times.
13. Which one of the following used in the passage on the  
previous page would best help you to get the meaning of  
"ante"?
- a. He is born.
  - b. Believe that man.
  - c. Even as adults.
  - d. Time before.
- 14- Susie's white horse loved to wade in mud. He would come in  
15 with clumps of mud all over his hooves and fetlocks. But  
Susie wanted her horse to be clean, so she would pull the  
clumps of mud off his feet. Yet it stuck stubbornly to  
the clumps of hair above each hoof, and her poor horse  
would sometimes whinny with pain.

(Hint: "lock" means "clump of hair")

14. Which one of the following used in the passage above would  
best help you to get the meaning of "fet"?
- a. Loved.
  - b. Wade.
  - c. Pull.
  - d. Hair.

15. Which one of the following used in the passage above would best help you to get the meaning of "fet"?

- a. Clumps of mud.
- b. Stuck stubbornly.
- c. Above each hoof.
- d. Whinny with pain.

-----  
DIRECTIONS: In each of the items in this part of the test, you will be asked to choose the correct definition of the underlined word used in the II sentence. Look at the I sentence for clues to meanings of word elements that may help you to define the desired word.

16. I. An "epitome" is something typical of the general characteristics of the whole.  
II. Greek literature uses many epithets in describing gods and men.

Epithets are:

- a. falsehoods that appear true.
- b. exaggerations of unimportant features.
- c. words expressing a feature belonging to a person or thing.
- d. indications of the inconsistency of the characters.

17. I. The defect of the eye resulting in "double vision" is diplopia.  
II. Pneumonia can be caused by a diplococcus infection.

Diplococcus means:

- a. any micro organism.
- b. a virus which travels from eye to lung.
- c. a bacteria occurring in pairs.
- d. disease of the eye.

18. I. "Hortus siccus" is a collection of dried plants.  
II. The suburban housewife's choice of horticulture as a hobby is smart.

Horticulture means:

- a. the raising of a garden.
- b. the caring for horses.
- c. the development of cultural interests.
- d. the collecting of coupons.

19. I. "The epidermis" is the outer layer of skin covering or lying upon the dermis, the inner skin layer.  
II. Epigene rocks were exposed to the weather for many of their formative years.

Epigene means:

- a. formed on the earth's surface.
  - b. formed by volcanic action.
  - c. formed by glacial erosion.
  - d. formed by the skeletons of dead animals.
- 

## Part II

DIRECTIONS: Put all your answers on the Part II answer sheet.  
-----

Below is a list of words. On your answer sheet, circle the part of the word you were taught and write what that part means on the line next to it. The first word has been completed for you.

Example: telesthesia

20. Phosphorus pentoxide

21. monody

22. pneumogastric  
-----

ON YOUR ANSWER SHEET fill in each blank with the word element which has the meaning to go with each of the following words. If you aren't sure how to spell the element, make the best GUESS you can.

23. man

24. same

25. false or pretended.  
-----

DIRECTIONS: Each item in this part of the test contains a paragraph with one underlined word and a hint. Use contextual clues and the hint to GUESS what the underlined word might mean. Of course you aren't expected to know exactly what the word means. But you should be able to make some reasonable guesses. ON YOUR ANSWER SHEET, make as many guesses as you can (up to four guesses) what each underlined word means.



26. Tim was extremely worried because his dog Farfle had been whining and whimpering lately. Tim decided to take the dog to the animal doctor. The doctor spent only a moment examining Farfle's head and said, "Nothing to worry about, son, it's just a case of odontalgia."

(Hint: the word element "algia" means "to be injured, or to ache")

27. The heels of Jim's feet are very sensitive and apt to ache when he walks for a long time. After his 17-mile Scout hike, Jim's heels were in terrible pain. His Scout leader teased Jim by saying, "You ought to take walking lessons from digitigrade animals."

(Hint: "grade" means "way of walking")

28. My baby sister Nancy is afraid of squirrels. One night she had a nightmare; she dreamt that she was eaten by a squirrel. When she woke up terrified, I tried to calm her by explaining that carpophagous animals like the squirrel don't eat people.

(Hint: "phagous" means "eating")

29. Whenever we let our dog go free, he was either destructive or ran away for a few days. Now we watch him closely when we're home and incarcerate him whenever we must go away.

(Hint: "In" means "in")

30. Jim wanted to buy a pretty gift for his girlfriend Jane but one that he could afford. In a novelty shop, he bought a lapis lazuli because it shined as blue as her eyes.

(Hint: "lazuli" means "azure (sky) blue")

31. I felt pretty important when I became the new executive manager of the firm. I even felt more sure of myself and more important when they gave me a passe partout so that I could get around the office and shops anytime and without any trouble.

(Hint: "partout" means "everywhere")

Your Name \_\_\_\_\_  
Teacher's Name \_\_\_\_\_

Answer Sheet

Part II

-----  
Example: telesthesia

20. Phosphorus pentoxide

21. monody

22. pneumogastric  
-----

23. man \_\_\_\_\_

24. same \_\_\_\_\_

25. false or pretended \_\_\_\_\_  
-----

26. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

27. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

28. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

29. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

30. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

31. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## APPENDIX H

### MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS OF THE INDEPENDENT AND DEPENDENT VARIABLES FOR THE PROGRAMMED, CONVENTIONAL, AND COMBINED TREATMENTS SUBJECTS

This appendix presents means, standard deviations, and intercorrelations of the 44 independent and dependent variables included in the study. These statistics are presented separately for subjects in the programmed and conventional conditions and for the total sample (programmed and conventional subjects). Associated *N*s are presented in each case. Table 66 shows the names of the 44 independent and dependent variables and is intended as a key to the data presented in the subsequent pages of this appendix.

Table 66

Names and Score Type of the Independent and Dependent Variables  
Included in the Research

<u>Var. No.</u>	<u>Variable Name</u>	<u>Range of Score</u>
	<u>(Student Data Card)</u>	
1.	Sex.....	Boys (1); Girls (2)
2.	Father's Education (No. of Years)	(0--?)
3.	Mother's Education (No. of Years)	(0--?)
4.	Number of older siblings.....	(0--?)
5.	Number of young siblings.....	(0--?)
6.	Teacher rankings of student anxiety ..... Ranked	(1--5) <sup>a</sup>
7.	Teacher rankings of student exhibitionism..... Ranked	(1--5) <sup>a</sup>
8.	Teacher rankings of student compulsivity..... Ranked	(1--5) <sup>a</sup>
9.	Teacher ranking of student creativity..... Ranked	(1--5) <sup>a</sup>
10.	Large-Thorndike Verbal IQ (Level IV, Form A).....	Raw score
11.	Reading score.....	Most recent standardized test score available from school records
12.	Seventh grade English mark.....	Final English grade given by seventh grade teacher

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Table 66  
(Continued from Previous Page)

<u>Var. No.</u>	<u>Variable Name</u>	<u>Range of Score</u>
13.	Age.....	Number of months
14.	Instructional Condition.....	Programed (1); Conventional (2)
<u>(Anxiety Test Scores)<sup>b</sup></u>		
15.	General Emotionality (5 items)...	(0--5)
16.	Generalized School Anxiety (6 items).....	(0--6)
17.	General Classroom Anxiety (14 items).....	(0--14)
18.	Peer Anxiety (7 items).....	(0--7)
19.	Parental Pressure for Achievement (7 items).....	(0--7)
20.	Teacher Anxiety (12 items).....	(0--12)
21.	Test Anxiety (11 items).....	(0--11)
22.	Total Anxiety (scores for variables 15-21 added together) (62 items).	(0--62)
<u>(Compulsivity Test Scores)<sup>b</sup></u>		
23.	Meticulousness (16 items).....	(0--16)
24.	Tendency to Finish (8 items).....	(0--8)
25.	Intolerance of Indefiniteness (6 items).....	(0--6)
26.	Cautiousness (8 items).....	(0--8)
27.	Uncomfortableness in Social Relationships (8 items).....	(0--8)
28.	Intolerance of Incompleteness (6 items).....	(0--6)
29.	Paralyzed Initiative (10 items)...	(0--10)
30.	Lie Scale (8 items).....	(0--8)
31.	Total Compulsivity Score (scores for variables 23,24,25,26,27,28, and 29 added) (62 items).....	(0--62)
<u>(Creativity Test Scores)<sup>c</sup></u>		
32.	Object Uses (6 items).....	(0--6)
33.	Imagination (Protocol).....	(0--22)
34.	Flexibility (Protocol).....	(0--21)
35.	Originality (Protocol).....	(0--?)

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Table 66  
(Continued from Previous Page)

<u>Var. No.</u>	<u>Variable Name</u>	<u>Range of Score</u>
36.	Fluency (Protocol)	(0--?)
37.	Total Creativity (subscores for variables 33-36) (Protocol)	(0--?)
38.	Total Creativity minus Convergent Thinking (Total Creativity minus the score for variables 32)..... (Exhibitionism Test Score) <sup>b</sup>	-?--+? <sup>d</sup>
39.	Total Exhibitionism (45 items)... (Criterion Test Scores)	(0--45)
40.	Recall (12 items).....	(0--12)
41.	Transfer (13 items).....	(0--13)
42.	Hypotheses Making (6 items).	(0--12) <sup>e</sup>
43.	Combined Recall and Transfer (25 items).....	(0--25)
44.	Total Criterion (sum of score for recall, transfer, and hypotheses making; variables 40, 41, 42) (31 items).....	(0--37)

<sup>a</sup>Students are placed into one of five categories ranging from most-like the definition (1) to least-like the definition (5). Students in a category (1-5) were tied for that rank.

<sup>b</sup>Items were scored zero for wrong, one for correct. Raw scores were then converted to per cents for use in dichotimizing subjects on the independent variables.

<sup>c</sup>Scores standardized to mean of 100 and a standard deviation of 20 for use in the analyses. Score for total creativity obtained after the subtest scores were standardized.

<sup>d</sup>The total creativity minus convergent thinking scores were derived after standardization of scores for object uses and the creativity subtests.

<sup>e</sup>A maximum of four relevant responses was scored for each of the six items; each such relevant response received one-half point.

Table 67

Means of the Independent and Dependent Variables for the  
Programed, Conventional, and Combined Groups

<u>V-No</u>	<u>N</u>	<u><math>\bar{X}</math>-Prog</u>	<u>N</u>	<u><math>\bar{X}</math>-Conv</u>	<u>N</u>	<u><math>\bar{X}</math>-Tot</u>
1	513	1.48	527	1.47	1040	1.48
2	413	2.30	448	2.28	861	2.29
3	413	2.31	445	2.25	858	2.28
4	403	1.35	442	1.40	845	1.38
5	399	1.67	432	1.61	831	1.64
6	380	2.98	428	3.02	808	3.00
7	412	3.00	449	3.03	861	3.04
8	382	2.99	430	3.05	812	3.02
9	380	3.02	431	3.09	811	3.06
10	513	57.83	527	58.01	1040	57.93
11	365	60.24	388	61.61	753	60.95
12	364	59.46	368	59.68	732	59.57
13	417	160.82	455	160.65	872	160.73
14	513	1.0	528	2.00	1041	1.51
15	494	37.48	506	38.66	1000	38.08
16	494	31.47	506	34.27	1000	32.89
17	494	39.80	506	39.90	1000	39.85
18	494	26.75	506	28.06	1000	27.41
19	494	49.34	506	49.54	1000	49.44
20	494	45.95	506	46.26	1000	46.11
21	494	46.34	506	49.40	1000	47.89
22	494	40.99	506	42.02	1000	41.51
23	495	68.35	506	68.83	1001	68.59
24	495	66.28	506	64.02	1001	65.14
25	495	53.80	506	53.07	1001	53.43
26	495	68.59	506	71.12	1001	69.87
27	495	43.04	506	43.04	1001	43.04
28	495	75.21	506	76.66	1001	75.94
29	495	52.44	506	54.71	1001	53.59
30	495	25.64	506	25.54	1001	25.59
31	495	61.20	506	62.03	1001	61.62
32	469	99.99	476	99.89	945	99.94
33	469	100.53	476	99.73	945	100.13
34	469	99.93	476	100.59	945	100.26
35	469	98.40	476	101.13	945	99.78
36	469	99.91	476	100.05	945	99.98
37	469	99.58	476	100.59	945	100.09
38	469	99.62	476	100.34	945	99.98
39	497	56.90	507	56.31	1004	56.60
40	513	6.18	528	8.27	1041	7.24
41	513	8.14	528	8.37	1041	8.26
42	513	3.80	528	4.26	1041	4.03
43	513	14.32	528	16.65	1041	15.50
44	513	18.12	528	20.91	1041	19.53

H-4

Table 68

Standard Deviations of the Independent and Dependent Variables  
for the Programed, Conventional, and Combined Groups

V-No	N	SD-Prog	N	SD-Conv	N	SD-Tot
1	513	.50	527	.50	1040	.50
2	413	.60	448	.60	861	.60
3	413	1.56	445	.54	858	1.15
4	403	1.35	442	1.50	845	1.43
5	399	1.53	432	1.60	831	1.56
6	380	1.39	428	1.38	808	1.38
7	412	1.39	449	1.38	861	1.38
8	382	1.37	430	1.39	812	1.38
9	380	1.38	431	1.39	811	1.39
10	513	9.87	527	10.11	1040	9.99
11	365	32.03	388	32.45	753	32.23
12	364	34.85	368	35.57	732	35.19
13	417	11.89	455	12.99	872	12.47
14	513	----	528	----	1041	.50
15	494	29.90	506	30.41	1000	30.15
16	494	26.19	506	26.54	1000	26.39
17	494	21.26	506	22.27	1000	21.77
18	494	23.70	506	23.41	1000	23.55
19	494	24.43	506	24.05	1000	24.23
20	494	17.49	506	17.41	1000	17.44
21	494	26.88	506	26.11	1000	26.53
22	494	15.16	506	15.11	1000	15.14
23	495	19.08	506	17.36	1001	18.22
24	495	23.21	506	23.30	938	19.43
25	495	19.16	506	19.68	1001	19.41
26	495	22.05	506	20.63	1001	21.37
27	495	22.52	506	21.65	1001	22.07
28	495	20.94	506	19.46	1001	20.21
29	495	21.01	506	21.72	1001	21.39
30	495	21.18	506	21.38	1001	21.27
31	495	11.35	506	10.37	1001	10.87
32	469	19.61	476	19.97	945	19.78
33	469	21.06	476	18.74	945	19.92
34	469	19.45	476	19.46	945	19.45
35	469	19.35	476	20.30	945	19.87
36	469	19.08	476	20.51	945	19.80
37	469	19.40	476	19.75	945	19.57
38	469	17.69	476	17.54	945	17.61
39	497	16.24	507	16.57	1004	16.40
40	513	2.87	528	2.52	1041	2.89
41	513	2.15	528	2.22	1041	2.18
42	513	1.56	528	1.77	1041	1.69
43	513	4.30	528	4.05	1041	4.33
44	513	5.02	528	4.86	1041	5.13

Table 69

Intercorrelations of the Independent and Dependent Variables for Subjects in the Programed Condition

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	-.06	----									
3	-.04	.23	----								
4	.10	-.16	-.09	----							
5	-.10	.07	.01	-.19	----						
6	-.05	-.05	-.06	-.06	-.01	----					
7	-.21	.00	.03	-.02	.05	.16	----				
8	.11	.07	-.07	-.01	-.08	.12	-.07	----			
9	-.05	.04	.06	-.07	.01	-.04	.44	.14	----		
10	.01	.15	.04	-.16	.02	.02	-.02	.10	.15	----	
11	.01	-.01	.02	-.04	.04	.01	.10	-.02	.06	.04	----
12	.05	-.12	.03	.07	.08	.00	-.02	.06	.04	-.06	.10
13	-.09	-.01	-.01	.10	.16	.03	.10	-.06	.00	-.05	.03
14	0	0	.00	0	0	0	0	0	0	0	0
15	.10	-.10	-.07	.09	-.02	-.02	-.05	-.03	-.04	-.06	-.06
16	.15	-.04	.01	.10	-.12	.00	-.03	-.02	-.11	-.19	-.01
17	.09	-.07	-.06	.22	-.05	.06	-.06	-.09	-.07	-.13	-.01
18	.03	-.02	-.07	.12	.05	-.11	-.11	-.01	-.02	-.01	-.03
19	-.15	.06	-.06	-.05	-.06	.09	.03	-.01	-.12	-.07	.02
20	.18	-.02	-.03	.00	-.08	-.02	-.20	.04	-.10	-.01	.05
21	.23	-.01	.00	.12	-.08	-.00	.00	.00	-.06	-.13	-.08
22	.16	-.05	-.06	.15	-.07	.01	-.09	-.04	-.11	-.15	-.02

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Table 69  
(Continued from Previous Page)

	Variable Number											
	12	13	14	15	16	17	18	19	20	21	22	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	----											
13	.07	----										
14	0	0	----									
15	-.10	-.05	0	----								
16	-.09	-.08	0	.24	----							
17	-.15	.02	0	.38	.50	----						
18	.03	-.01	0	.35	.34	.47	----					
19	-.17	-.08	0	.03	.19	.23	.02	----				
20	-.02	-.10	0	.15	.40	.33	.25	.09	----			
21	-.14	-.07	0	.22	.70	.50	.32	.20	.39	----		
22	-.15	-.07	0	.49	.74	.82	.60	.38	.60	.78	----	

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Table 69

(Continued from Previous Page)

	<u>Variable Number</u>										
	1	2	3	4	5	6	7	8	9	10	11
23	.09	.03	.04	-.04	-.03	-.04	-.06	.12	-.01	-.04	.03
24	.01	.03	.00	-.09	-.01	.05	-.01	.13	-.02	.01	.01
25	.00	-.02	-.07	.00	-.10	.03	-.06	.06	.05	-.03	.02
26	.08	.05	-.04	-.06	-.06	-.03	-.07	.16	-.05	.06	.00
27	-.08	-.05	-.02	.01	.11	-.03	-.08	.01	-.05	-.05	.07
28	.14	-.03	.03	-.05	-.08	.01	.01	.18	.03	.06	.04
29	.09	-.07	-.03	.09	.01	-.05	-.11	-.04	-.11	-.11	-.03
30	.07	.02	.00	-.12	-.04	-.04	-.03	.07	-.06	-.06	.08
31	.08	-.01	-.00	-.04	-.02	-.05	-.10	.15	-.06	-.04	.04
32	-.29	.09	.06	-.16	.07	.02	.08	.07	.06	.30	-.02
33	.10	.10	.09	-.13	.01	.01	-.01	.03	.13	.29	-.01
34	.05	.10	.04	-.09	.10	.06	.04	-.09	-.05	.13	-.00
35	.13	.15	.13	-.11	.10	-.04	-.01	.01	-.03	.18	.01
36	.04	.11	.02	-.06	.02	-.08	.03	-.03	.08	.20	.04
37	.12	.17	.10	-.15	.08	-.02	.02	-.03	.05	.29	.01
38	.31	.06	.03	-.01	.01	-.03	-.05	-.07	-.01	-.01	.03
39	.03	.05	.05	-.00	-.01	.05	.29	-.08	.17	.04	.05
40	.02	.20	.09	-.20	-.02	-.04	.01	.15	.06	.59	-.02
41	-.03	.20	.10	-.15	-.04	-.05	.04	.03	.12	.55	.04
42	.00	.04	.04	-.06	.04	-.02	-.00	.10	.05	.27	-.05
43	.00	.24	.11	-.21	-.03	-.05	.02	.12	.11	.67	.01
44	.00	.22	.11	-.20	-.02	-.05	.02	.14	.10	.66	-.01

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Table 69

(Continued from Previous Page)

	<u>Variable Number</u>													
	12	13	14	15	16	17	18	19	20	21	22			
23	.04	-.10	0	-.09	.11	-.17	.00	-.07	.23	.07	.01			
24	-.02	-.01	0	-.18	.08	-.18	-.03	-.04	.16	.04	-.04			
25	-.04	-.07	0	.17	.20	.24	.18	.08	.22	.21	.30			
26	-.04	-.11	0	-.02	.22	.00	.08	-.03	.28	.18	.16			
27	.02	.01	0	.17	.23	.26	.32	.03	.23	.18	.32			
28	.01	-.01	0	-.02	.03	-.13	-.02	.01	.19	.04	.01			
29	.03	-.08	0	.28	.28	.37	.32	.10	.18	.35	.43			
30	-.02	.02	0	-.17	.00	-.16	-.10	-.06	.12	-.05	-.10			
31	.02	-.10	0	.05	.29	.07	.21	.00	.39	.26	.28			
32	-.05	.00	0	-.05	-.15	-.09	-.05	-.04	-.14	-.21	-.17			
33	-.42	-.04	0	.03	.01	.06	-.03	-.02	.04	-.05	.01			
34	-.15	-.04	0	.03	.10	.08	.02	.13	-.01	.07	.09			
35	-.02	-.05	0	.02	.02	-.03	-.01	.02	.03	.02	.01			
36	-.01	.04	0	-.07	-.07	-.01	-.02	-.02	.01	-.03	-.04			
37	-.24	-.03	0	.00	.02	.04	-.02	.04	.03	.00	.03			
38	-.14	-.02	0	.04	.13	.10	.03	.06	.13	.16	.15			
39	-.04	.02	0	-.10	-.13	-.07	-.25	.01	-.11	-.13	-.16			
40	.00	-.02	0	-.06	-.13	-.16	-.08	-.15	-.07	-.15	-.19			
41	-.17	.02	0	-.09	-.16	-.15	-.07	-.10	-.07	-.20	-.19			
42	.09	.03	0	-.08	-.05	-.08	-.01	-.09	-.02	-.04	-.08			
43	-.08	.00	0	-.09	-.17	-.18	-.08	-.15	-.08	-.19	-.22			
44	-.04	.01	0	-.10	-.16	-.18	-.08	-.15	-.08	-.18	-.21			

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Table 69  
(Continued from Previous Page)

	Variable Number										
	23	24	25	26	27	28	29	30	31	32	33
23	----										
24	.56	----									
25	.03	-.06	----								
26	.50	.38	.22	----							
27	.09	.02	.24	.12	----						
28	.38	.38	.09	.29	.03	----					
29	-.18	-.27	.43	.02	.26	-.03	----				
30	.21	.22	-.10	.05	-.12	.13	-.19	----			
31	.77	.58	.39	.67	.45	.52	.25	.09	----		
32	-.06	.01	-.03	.00	.07	.03	-.09	-.19	-.02	----	
33	-.05	-.02	.00	.03	-.07	.00	-.06	-.01	-.05	.13	----
34	-.01	-.02	.04	-.02	.01	-.10	-.05	.02	-.04	-.02	.18
35	-.04	-.03	-.00	.02	.03	.01	-.06	.03	-.03	.05	.13
36	-.00	.01	-.00	.00	-.05	-.00	-.03	-.04	-.03	.07	.19
37	-.04	-.02	.01	.01	-.03	-.03	-.08	.00	-.06	.09	.60
38	.02	-.03	.03	.01	-.07	-.04	-.01	.14	-.02	-.68	.34
39	-.19	-.11	-.20	-.20	-.26	-.19	-.20	.03	-.35	-.01	.14
40	-.04	.00	-.05	-.00	-.05	.02	-.14	-.05	-.08	.28	.19
41	-.04	.03	-.01	.05	-.10	-.03	-.10	-.01	-.07	.35	.27
42	.03	.06	-.05	.03	-.01	.04	-.16	-.01	-.02	.18	.12
43	-.05	.02	-.04	.02	-.08	-.00	-.14	-.04	-.09	.36	.26
44	-.03	.04	-.05	.03	-.08	.01	-.17	-.04	-.08	.36	.26

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Table 69

(Continued from Previous Page)

	<u>Variable Number</u>										
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	.35	----									
36	.33	.40	----								
37	.68	.71	.70	----							
38	.51	.49	.46	.67	----						
39	.13	.09	.14	.18	.14	----					
40	.07	.12	.17	.20	-.06	.05	----				
41	.06	.11	.11	.21	-.10	.10	.46	----			
42	.15	.16	.17	.22	.03	.06	.28	.27	----		
43	.08	.14	.16	.24	-.09	.08	.90	.81	.32	----	
44	.11	.17	.19	.27	-.07	.09	.85	.77	.59	.96	----

Table 70

Table of N's to Accompany Intercorrelations of the Independent and Dependent Variables  
for Subjects in the Programed Condition

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	413	----									
3	413	409	----								
4	403	399	398	----							
5	399	396	395	386	----						
6	380	375	375	368	363	----					
7	412	407	407	399	393	377	----				
8	382	377	377	369	365	376	377	----			
9	380	375	375	366	363	375	377	377	----		
10	513	413	413	403	399	380	412	382	380	----	
11	365	361	361	353	348	331	359	334	331	365	----
12	364	359	359	352	347	327	358	330	327	364	346
13	417	412	413	402	398	379	411	381	379	417	365
14	513	413	413	403	399	380	412	382	380	513	365
15	494	410	410	400	396	377	409	379	377	494	362
16	494	410	410	400	396	377	409	379	377	494	362
17	494	410	410	400	396	377	409	379	377	494	362
18	494	410	410	400	396	377	409	379	377	494	362
19	494	410	410	400	396	377	409	379	377	494	362
20	494	410	410	400	396	377	409	379	377	494	362
21	494	410	410	400	396	377	409	379	377	494	362
22	494	410	410	400	396	377	409	379	377	494	362

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Table 70  
(Continued from Previous Page)

	Variable Number											
	12	13	14	15	16	17	18	19	20	21	22	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	----											
13	363	----										
14	364	417	----									
15	363	414	494	----								
16	363	414	494	494	----							
17	363	414	494	494	494	----						
18	363	414	494	494	494	494	----					
19	363	414	494	494	494	494	494	----				
20	363	414	494	494	494	494	494	494	----			
21	363	414	494	494	494	494	494	494	494	----		
22	363	414	494	494	494	494	494	494	494	494	----	

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Table 70

(Continued from Previous Page)

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
23	495	411	411	401	397	378	410	380	378	495	364
24	495	411	411	401	397	378	410	380	378	495	364
25	495	411	411	401	397	378	410	380	378	495	364
26	495	411	411	401	397	378	410	380	378	495	364
27	495	411	411	401	397	378	410	380	378	495	364
28	495	411	411	401	397	378	410	380	378	495	364
29	495	411	411	401	397	378	410	380	378	495	364
30	495	411	411	401	397	378	410	380	378	495	364
31	495	411	411	401	397	378	410	380	378	495	364
32	469	387	388	376	373	353	385	356	354	469	341
33	469	387	388	376	373	353	385	356	354	469	341
34	469	387	388	376	373	353	385	356	354	469	341
35	469	387	388	376	373	353	385	356	354	469	341
36	469	387	388	376	373	353	385	356	354	469	341
37	469	387	388	376	373	353	385	356	354	469	341
38	469	387	388	376	373	353	385	356	354	469	341
39	497	413	413	403	399	380	412	382	380	497	365
40	513	413	413	403	399	380	412	382	380	513	365
41	513	413	413	403	399	380	412	382	380	513	365
42	513	413	413	403	399	380	412	382	380	513	365
43	513	413	413	403	399	380	412	382	380	513	365
44	513	413	413	403	399	380	412	382	380	513	365

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Table 70

(Continued from Previous Page)

Variable Number											
	12	13	14	15	16	17	18	19	20	21	22
23	363	415	495	492	492	492	492	492	492	492	492
24	363	415	495	492	492	492	492	492	492	492	492
25	363	415	495	492	492	492	492	492	492	492	492
26	363	415	495	492	492	492	492	492	492	492	492
27	363	415	495	492	492	492	492	492	492	492	492
28	363	415	495	492	492	492	492	492	492	492	492
29	363	415	495	492	492	492	492	492	492	492	492
30	363	415	495	492	492	492	492	492	492	492	492
31	363	415	495	492	492	492	492	492	492	492	492
32	338	390	469	464	464	464	464	464	464	464	464
33	338	390	469	464	464	464	464	464	464	464	464
34	338	390	469	464	464	464	464	464	464	464	464
35	338	390	469	464	464	464	464	464	464	464	464
36	338	390	469	464	464	464	464	464	464	464	464
37	338	390	469	464	464	464	464	464	464	464	464
38	338	390	469	464	464	464	464	464	464	464	464
39	364	417	497	492	492	492	492	492	492	492	492
40	364	417	513	494	494	494	494	494	494	494	494
41	364	417	513	494	494	494	494	494	494	494	494
42	364	417	513	494	494	494	494	494	494	494	494
43	364	417	513	494	494	494	494	494	494	494	494
44	364	417	513	494	494	494	494	494	494	494	494

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Table 70

(Continued from Previous Page)

Variable Number											
	23	24	25	26	27	28	29	30	31	32	33
23	----										
24	495	----									
25	495	495	----								
26	495	495	495	----							
27	495	495	495	495	----						
28	495	495	495	495	495	----					
29	495	495	495	495	495	495	----				
30	495	495	495	495	495	495	495	----			
31	495	495	495	495	495	495	495	495	----		
32	465	465	465	465	465	465	465	465	465	----	
33	465	465	465	465	465	465	465	465	465	469	----
34	465	465	465	465	465	465	465	465	465	469	469
35	465	465	465	465	465	465	465	465	465	469	469
36	465	465	465	465	465	465	465	465	465	469	469
37	465	465	465	465	465	465	465	465	465	469	469
38	465	465	465	465	465	465	465	465	465	469	469
39	493	493	493	493	493	493	493	493	493	469	469
40	495	495	495	495	495	495	495	495	495	469	469
41	495	495	495	495	495	495	495	495	495	469	469
42	495	495	495	495	495	495	495	495	495	469	469
43	495	495	495	495	495	495	495	495	495	469	469
44	495	495	495	495	495	495	495	495	495	469	469

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Table 70

(Continued from Previous Page)

	<u>Variable Number</u>										
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	469	----									
36	469	469	----								
37	469	469	469	----							
38	469	469	469	469	----						
39	469	469	469	469	469	----					
40	469	469	469	469	469	497	----				
41	469	469	469	469	469	497	513	----			
42	469	469	469	469	469	497	513	513	----		
43	469	469	469	469	469	497	513	513	513	----	
44	469	469	469	469	469	497	513	513	513	513	----

Table 71

Intercorrelations of the Independent and Dependent Variables for Subjects in the Conventional Condition

	<u>Variable Number</u>										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	-.10	----									
3	-.14	.55	----								
4	-.02	-.20	-.11	----							
5	.02	-.02	-.07	-.02	----						
6	.01	.10	.07	-.06	.08	----					
7	-.15	.05	.12	.02	-.06	.21	----				
8	.24	-.02	.01	-.04	.00	.08	-.04	----			
9	.05	.08	.15	-.02	-.02	.12	.23	.26	----		
10	.00	.20	.10	-.21	-.04	.04	.00	.07	.21	----	
11	.04	-.01	-.08	-.02	-.04	-.02	.04	-.01	.04	.12	----
12	.07	-.15	-.19	.08	.10	-.03	-.11	.00	-.02	.04	.13
13	-.07	-.01	-.01	.12	.00	.03	-.02	-.05	-.03	-.09	.01
14	0	0	0	0	0	0	0	0	0	0	0
15	.09	.03	-.03	-.00	.02	.00	-.00	-.04	.01	.01	.02
16	.08	-.07	-.07	.00	-.02	.02	.03	.05	.02	-.19	.02
17	.04	-.03	-.04	.02	.07	-.01	.01	-.13	-.05	-.20	-.06
18	-.01	-.11	-.04	.06	-.04	-.02	-.17	-.01	-.01	-.08	-.05
19	-.14	-.06	.00	-.01	.02	.13	.16	-.12	-.07	-.14	-.04
20	.14	-.12	-.11	-.04	.04	.01	-.05	.08	-.04	-.11	-.02
21	.21	-.06	-.04	.00	-.02	.12	.01	.04	-.03	-.28	.03
22	.10	-.09	-.07	.01	.03	.06	-.01	-.04	-.05	-.24	-.03

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Table 71  
(Continued from Previous Page)

	Variable Number										
	12	13	14	15	16	17	18	19	20	21	22
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12	----										
13	.01	----									
14	0	0	----								
15	.00	.01	0	----							
16	.05	-.09	0	.23	----						
17	.04	-.05	0	.38	.47	----					
18	.03	.02	0	.24	.29	.35	----				
19	-.07	.01	0	.05	.21	.19	.06	----			
20	-.01	-.11	0	.19	.41	.31	.28	.17	----		
21	.02	-.06	0	.27	.67	.51	.22	.25	.41	----	
22	.02	-.06	0	.50	.71	.79	.53	.41	.63	.78	----

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Table 71

(Continued from Previous Page)

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
23	.11	-.08	.00	-.05	.02	-.00	-.05	.17	.01	-.04	.01
24	.01	-.06	-.01	.00	-.02	.05	-.06	.17	-.03	.00	.04
25	-.06	.05	.01	.02	.03	.01	-.06	-.00	.02	.01	-.05
26	-.11	.08	.03	-.07	.01	.09	-.04	.18	.12	.10	.06
27	-.08	-.14	-.06	.03	.05	-.02	-.04	.03	-.02	.05	-.09
28	.12	-.12	-.01	-.03	-.03	-.07	-.04	.10	-.06	.05	.00
29	.08	.00	.00	.04	.05	-.04	-.10	-.06	.01	-.09	-.02
30	.07	-.02	.10	-.08	.05	.07	.05	.08	.01	-.16	.04
31	.01	-.09	-.02	-.02	.04	.00	-.12	.18	.00	-.02	-.01
32	-.20	.12	.08	-.09	.05	.05	-.01	-.07	.05	.37	.07
33	.02	.10	.11	-.04	.05	-.02	.01	.05	.13	.15	-.05
34	.03	.06	.08	.12	.00	.09	.09	.03	.09	-.02	.00
35	.05	.07	.03	-.02	.01	.05	.02	.08	.16	.19	.12
36	.09	.08	.08	-.06	-.01	.05	.01	.09	.12	.18	.09
37	.07	.12	.10	.00	.01	.07	.05	.09	.18	.18	.07
38	.20	.00	.02	.07	-.03	.01	.05	.13	.10	-.14	.00
39	.10	.16	.11	-.06	-.09	.06	.30	-.03	.13	.05	-.03
40	.13	.27	.15	-.18	-.05	.01	-.02	.17	.19	.45	.05
41	.07	.24	.20	-.11	-.08	.05	.02	.13	.12	.50	.01
42	.08	.08	-.12	-.11	-.02	.03	-.08	.01	.03	.29	.07
43	.12	.30	.20	-.17	-.07	.04	.00	.18	.18	.56	.04
44	.13	.28	.13	-.18	-.07	.04	-.03	.15	.16	.57	.05

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Table 71

(Continued from Previous Page)

	Variable Number										
	12	13	14	15	16	17	18	19	20	21	22
23	.05	.01	0	-.16	.07	-.16	.04	-.01	.19	.09	.00
24	.15	.02	0	-.16	.05	-.21	.04	.01	.12	.00	-.06
25	.03	-.03	0	.19	.22	.23	.24	.03	.24	.19	.30
26	.06	-.01	0	.05	.14	.04	.16	.03	.26	.11	.17
27	.05	.00	0	-.09	.13	.23	.27	.03	.27	.09	.26
28	.07	-.06	0	-.14	.02	-.13	.03	.04	.08	.03	-.03
29	.01	-.11	0	.34	.24	.38	.27	.05	.21	.31	.42
30	.09	.02	0	-.25	-.02	-.21	-.09	.05	.08	-.04	-.12
31	.12	-.03	0	.01	.23	.06	.26	.06	.36	.22	.26
32	.06	.04	0	-.02	-.17	-.08	-.10	-.04	-.22	-.23	-.19
33	-.17	.03	0	.02	-.08	-.04	.02	-.04	-.02	-.09	-.05
34	-.13	-.03	0	-.07	-.02	-.05	.00	.10	-.04	-.01	-.02
35	.00	-.03	0	-.03	-.05	-.10	-.04	-.05	-.07	-.08	-.10
36	-.03	-.10	0	-.04	-.02	-.05	-.04	.03	-.06	-.05	-.06
37	-.12	-.05	0	-.05	-.06	-.09	-.02	.02	-.07	-.08	-.09
38	-.13	-.07	0	-.02	.09	-.01	.06	.04	.11	.12	.08
39	-.04	-.13	0	-.03	-.09	-.03	-.27	.12	-.14	-.03	-.10
40	-.23	-.10	0	-.04	-.14	-.21	-.03	-.16	-.06	-.13	-.19
41	-.08	-.15	0	-.02	-.17	-.20	-.05	-.10	-.09	-.18	-.20
42	.09	-.02	0	-.04	-.10	-.07	-.01	-.11	-.03	-.09	-.10
43	-.19	-.14	0	-.04	-.18	-.24	-.05	-.16	-.08	-.18	-.22
44	-.12	-.13	0	-.04	-.19	-.23	-.04	-.17	-.08	-.18	-.22

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Table 71

(Continued from Previous Page)

<u>Variable Number</u>											
	23	24	25	26	27	28	29	30	31	32	33
23	----										
24	.43	----									
25	-.01	-.01	----								
26	.39	.38	.18	----							
27	-.05	-.02	.26	.08	----						
28	.39	.33	-.01	.25	-.01	----					
29	-.12	-.21	.46	.06		.28	----				
30	.12	.24	-.04	.00		.09	-.25	----			
31	.69	.58	.38	.66	.31	.50	.28	.06	----		
32	-.14	-.04	-.06	.05	.04	-.03	-.08	-.13	-.09	----	
33	.00	-.03	-.04	-.01	-.07	-.09	.00	-.02	-.07	.14	----
34	-.05	-.06	-.05	-.05	.00	-.05	-.09	.07	-.12	-.01	.17
35	-.06	.04	-.07	-.01	-.08	-.04	-.14	.06	-.11	.13	.27
36	.03	-.07	-.09	-.03	-.03	.03	-.16	.03	-.09	.12	.20
37	-.03	-.04	-.09	-.04	-.07	-.05	-.15	.05	-.15	.14	.58
38	.09	.00	-.03	-.07	-.08	-.01	-.05	.14	-.04	-.66	.33
39	-.16	-.13	-.20	-.18	-.26	-.12	-.11	.05	-.31	.04	.14
40	.04	.04	.01	.08	-.03	.04	-.06	-.06	.01	.14	.19
41	.01	.03	.05	.09	-.01	.08	.01	-.05	.03	.27	.18
42	.03	.04	-.01	.07	-.02	.04	-.03	-.03	.01	.22	.20
43	.03	.04	.04	.10	-.03	.07	-.03	-.07	.03	.24	.22
44	.03	.05	.03	.11	-.03	.07	-.04	-.07	.03	.28	.26

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Table 71  
(Continued from Previous Page)

Variable Number											
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	.31	----									
36	.40	.40	----								
37	.68	.73	.74	----							
38	.53	.45	.47	.65	----						
39	.19	.17	.21	.26	.16	----					
40	.09	.16	.21	.24	.08	.11	----				
41	.05	.14	.09	.17	-.08	.10	.46	----			
42	.14	.16	.26	.28	.04	.02	.28	.19	----		
43	.09	.18	.18	.24	.00	.12	.87	.83	.28	----	
44	.12	.21	.25	.30	.02	.11	.83	.77	.60	.94	----

Table 72

Table of N's to Accompany Intercorrelations of the Independent and Dependent Variables for Subjects in the Conventional Condition

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	448	----									
3	445	439	----								
4	442	435	432	----							
5	432	426	424	420	----						
6	428	421	419	415	405	----					
7	449	442	439	436	426	426	----				
8	430	423	421	417	407	426	425	----			
9	431	424	422	418	408	428	427	429	----		
10	526	447	444	441	431	427	448	429	430	----	
11	388	383	380	378	370	362	382	365	365	388	----
12	368	363	361	359	352	342	362	344	345	367	352
13	455	448	445	442	432	428	449	430	431	454	388
14	527	448	445	442	432	428	449	430	431	527	388
15	506	447	444	441	431	427	448	429	430	505	387
16	506	447	444	441	431	427	448	429	430	505	387
17	506	447	444	441	431	427	448	429	430	505	387
18	506	447	444	441	431	427	448	429	430	505	387
19	506	447	444	441	431	427	448	429	430	505	387
20	506	447	444	441	431	427	448	429	430	505	387
21	506	447	444	441	431	427	448	429	430	505	387
22	506	447	444	441	431	427	448	429	430	505	387

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Table 72

(Continued from Previous Page)

	<u>Variable Number</u>											
	12	13	14	15	16	17	18	19	20	21	22	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	----											
13	368	----										
14	368	455	----									
15	368	454	506	----								
16	368	454	506	506	----							
17	368	454	506	506	506	----						
18	368	454	506	506	506	506	----					
19	368	454	506	506	506	506	506	----				
20	368	454	506	506	506	506	506	506	----			
21	368	454	506	506	506	506	506	506	506	----		
22	368	454	506	506	506	506	506	506	506	506	----	

(Continued on Next Page)

Table 72

(Continued from Previous Page)

Variable Number

	1	2	3	4	5	6	7	8	9	10	11
23	506	447	444	441	431	427	448	429	430	505	387
24	506	447	444	441	431	427	448	429	430	505	387
25	506	447	444	441	431	427	448	429	430	505	387
26	506	447	444	441	431	427	448	429	430	505	387
27	506	447	444	441	431	427	448	429	430	505	387
28	506	447	444	441	431	427	448	429	430	505	387
29	506	447	444	441	431	427	448	429	430	505	387
30	506	447	444	441	431	427	448	429	430	505	387
31	506	447	444	441	431	427	448	429	430	505	387
32	476	444	441	437	428	423	444	425	426	475	385
33	476	444	441	437	428	423	444	425	426	475	385
34	476	444	441	437	428	423	444	425	426	475	385
35	476	444	441	437	428	423	444	425	426	475	385
36	476	444	441	437	428	423	444	425	426	475	385
37	476	444	441	437	428	423	444	425	426	475	385
38	476	444	441	437	428	423	444	425	426	475	385
39	507	447	444	441	431	427	448	429	430	506	388
40	527	448	445	442	432	428	449	430	431	527	388
41	527	448	445	442	432	428	449	430	431	527	388
42	527	448	445	442	432	428	449	430	431	527	388
43	527	448	445	442	432	428	449	430	431	527	388
44	527	448	445	442	432	428	449	430	431	527	388

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Table 72  
(Continued from Previous Page)

	Variable Number										
	12	13	14	15	16	17	18	19	20	21	22
23	368	454	506	505	505	505	505	505	505	505	505
24	368	454	506	505	505	505	505	505	505	505	505
25	368	454	506	505	505	505	505	505	505	505	505
26	368	454	506	505	505	505	505	505	505	505	505
27	368	454	506	505	505	505	505	505	505	505	505
28	368	454	506	505	505	505	505	505	505	505	505
29	368	454	506	505	505	505	505	505	505	505	505
30	368	454	506	505	505	505	505	505	505	505	505
31	368	454	506	505	505	505	505	505	505	505	505
32	364	450	476	473	473	473	473	473	473	473	473
33	364	450	476	473	473	473	473	473	473	473	473
34	364	450	476	473	473	473	473	473	473	473	473
35	364	450	476	473	473	473	473	473	473	473	473
36	364	450	476	473	473	473	473	473	473	473	473
37	364	450	476	473	473	473	473	473	473	473	473
38	364	450	476	473	473	473	473	473	473	473	473
39	367	454	507	505	505	505	505	505	505	505	505
40	368	455	528	506	506	506	506	506	506	506	506
41	368	455	528	506	506	506	506	506	506	506	506
42	368	455	528	506	506	506	506	506	506	506	506
43	368	455	528	506	506	506	506	506	506	506	506
44	368	455	528	506	506	506	506	506	506	506	506

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Table 72

(Continued from Previous Page)

Variable Number											
	23	24	25	26	27	28	29	30	31	32	33
23	----										
24	506	----									
25	506	506	----								
26	506	506	506	----							
27	506	506	506	506	----						
28	506	506	506	506	506	----					
29	506	506	506	506	506	506	----				
30	506	506	506	506	506	506	506	----			
31	506	506	506	506	506	506	506	506	----		
32	473	473	473	473	473	473	473	473	473	----	
33	473	473	473	473	473	473	473	473	473	476	----
34	473	473	473	473	473	473	473	473	473	476	476
35	473	473	473	473	473	473	473	473	473	476	476
36	473	473	473	473	473	473	473	473	473	476	476
37	473	473	473	473	473	473	473	473	473	476	476
38	473	473	473	473	473	473	473	473	473	476	476
39	505	505	505	505	505	505	505	505	505	475	475
40	506	506	506	506	506	506	506	506	506	476	476
41	506	506	506	506	506	506	506	506	506	476	476
42	506	506	506	506	506	506	506	506	506	476	476
43	506	506	506	506	506	506	506	506	506	476	476
44	506	506	506	506	506	506	506	506	506	476	476

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Table 72

(Continued from Previous Page)

	Variable Number										
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	476	----									
36	476	476	----								
37	476	476	476	----							
38	476	476	476	476	----						
39	475	475	475	475	475	----					
40	476	476	476	476	476	507	----				
41	476	476	476	476	476	507	528	----			
42	476	476	476	476	476	507	528	528	----		
43	476	476	476	476	476	507	528	528	528	----	
44	476	476	476	476	476	507	528	528	528	528	----

Table 73

Intercorrelations of the Independent and Dependent Variables for Subjects in the

Combined Programmed and Conventional Groups

	<u>Variable Number</u>										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	-.08	----									
3	-.06	.28	----								
4	.04	-.18	-.08	----							
5	-.04	.02	-.01	.10	----						
6	-.02	.03	-.02	-.06	.04	----					
7	-.18	.02	.05	.00	-.01	.19	----				
8	.18	.02	-.04	-.03	-.04	.10	-.05	----			
9	.00	.06	.07	-.05	-.00	.04	.33	.20	----		
10	.00	.18	.05	-.18	-.01	.03	-.01	.09	.18	----	
11	.03	-.01	-.01	-.03	.00	-.00	.07	-.01	.05	.08	----
12	.06	-.14	-.02	.03	.09	-.01	-.06	.03	.01	-.01	.11
13	-.03	-.01	-.01	.11	.07	.03	.03	-.05	-.02	-.07	.02
14	-.01	-.02	-.03	.02	-.02	.01	.03	.02	.03	.01	.02
15	.09	-.03	-.05	.04	.00	-.01	-.02	-.03	-.01	-.02	-.01
16	.12	-.06	-.01	.04	-.07	.02	.01	.02	-.04	-.18	.01
17	.06	-.05	-.05	.11	.02	.02	-.02	-.11	-.06	-.17	-.03
18	.01	-.06	-.06	.09	.00	-.06	-.14	-.01	-.01	-.05	-.04
19	-.15	-.00	-.04	-.03	-.02	.11	.10	-.07	-.09	-.11	-.01
20	.16	-.07	-.05	-.02	-.02	-.01	-.12	.06	-.07	-.06	.02
21	.25	-.04	-.01	.05	-.05	.06	.01	.02	-.04	-.23	-.02
22	.13	-.07	-.06	.07	-.02	.03	.05	-.04	-.08	-.20	-.03

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Table 73

(Continued from Previous Page)

	<u>Variable Number</u>											
	12	13	14	15	16	17	18	19	20	21	22	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	----											
13	.04	----										
14	.00	-.01	----									
15	-.05	-.02	.02	----								
16	-.02	-.08	.05	.24	----							
17	-.05	-.02	.00	.38	.48	----						
18	.03	.01	.03	.29	.32	.41	----					
19	-.12	-.03	.00	.04	.20	.21	.04	----				
20	-.00	-.10	.01	.17	.40	.32	.27	.13	----			
21	-.05	-.07	.06	.24	.69	.50	.27	.23	.40	----		
22	-.06	-.07	.03	.50	.72	.80	.56	.40	.61	.78	----	

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Table 73

(Continued from Previous Page)

	<u>Variable Number</u>										
	1	2	3	4	5	6	7	8	9	10	11
23	.10	-.03	.03	-.05	-.01	-.05	-.05	.14	-.00	-.04	.02
24	.01	-.01	.00	-.04	-.02	.05	-.04	.15	-.03	.00	.02
25	-.03	.02	-.04	.01	-.03	.02	-.06	.03	-.01	-.01	-.01
26	-.01	.06	-.02	-.06	-.02	.03	-.05	.18	.04	.08	.03
27	-.08	-.10	-.02	.02	.08	-.02	-.06	.02	-.04	-.00	-.01
28	.13	-.08	.02	-.04	-.05	-.03	-.02	.14	-.01	.05	.02
29	.09	-.03	-.02	.07	.03	-.04	-.10	-.05	-.04	-.10	-.02
30	.07	.00	.02	-.10	.01	.02	.02	.07	-.02	-.11	.06
31	.04	-.05	-.01	-.03	.01	-.02	-.11	.16	-.03	-.03	.02
32	-.24	.10	.07	-.12	.06	.04	.03	-.01	.06	.33	.02
33	.06	.10	.10	-.08	.03	-.01	.00	.04	.13	.22	-.03
34	.04	.08	.06	.03	.04	.08	.07	-.02	.03	.05	.00
35	.09	.11	.07	-.05	.04	.01	.01	.05	.08	.19	.07
36	.06	.09	.05	-.06	.00	-.01	.02	.03	.10	.19	.07
37	.09	.14	.10	-.06	.04	.03	.03	.04	.13	.24	.04
38	.25	.03	.03	.04	-.01	-.01	.01	.04	.05	-.07	.01
39	.06	.11	.06	-.06	-.05	.05	.29	-.05	.15	.05	.01
40	.06	.21	.08	-.17	-.04	-.01	.00	.16	.13	.49	.02
41	.02	.22	.11	-.13	-.06	.00	.03	.09	.12	.52	.02
42	.04	.06	-.01	-.09	.00	.00	-.04	.05	.04	.28	.01
43	.05	.26	.11	-.18	-.06	-.00	.02	.15	.15	.59	.03
44	.06	.24	.09	-.18	-.05	-.00	.00	.15	.14	.59	.03

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Table 73

(Continued from Previous Page)

	<u>Variable Number</u>										
	12	13	14	15	16	17	18	19	20	21	22
23	.04	-.05	.01	-.12	.09	-.17	.02	-.04	.21	.08	.00
24	.07	.01	-.05	-.17	.06	-.20	.00	-.02	.14	.02	-.05
25	-.00	-.05	-.02	.18	.21	.23	.21	.05	.23	.20	.30
26	.01	-.06	.06	.01	.18	.02	.12	.00	.27	.15	.17
27	.03	.01	-.00	.13	.18	.24	.29	.03	.25	.14	.29
28	.04	-.03	.04	-.08	.03	-.13	.00	.03	.14	.03	-.01
29	.01	-.09	.05	.31	.26	.38	.29	.07	.19	.33	.42
30	.04	.02	-.00	-.21	-.01	-.18	-.09	-.01	.10	-.04	-.11
31	.07	-.06	.04	.03	.26	.06	.24	.03	.38	.24	.27
32	.01	.02	-.00	-.03	-.16	-.08	-.08	-.04	-.18	-.22	-.18
33	-.30	-.00	-.02	.02	-.03	.02	-.00	-.03	.01	-.07	-.02
34	-.14	-.04	.02	-.02	.04	.01	.01	.11	-.02	.03	.04
35	-.01	-.04	.07	-.01	-.02	-.07	-.03	-.01	-.02	-.03	-.05
36	-.02	-.04	.00	-.06	-.04	-.03	-.03	.01	-.03	-.04	-.05
37	-.18	-.04	.03	-.02	-.02	-.03	-.02	.03	-.02	-.04	-.03
38	-.14	-.05	.02	.01	.11	.04	.04	.05	.12	.14	.12
39	-.04	-.06	-.02	-.06	-.11	-.05	-.26	.07	-.13	-.08	-.13
40	-.10	-.06	.36	-.04	-.11	-.17	-.04	-.14	-.06	-.11	-.16
41	-.12	-.07	.05	-.05	-.16	-.17	-.06	-.10	-.08	-.18	-.19
42	.09	.00	.14	-.05	-.07	-.07	-.01	-.10	-.02	-.06	-.09
43	-.13	-.08	.27	-.05	-.15	-.20	-.06	-.14	-.08	-.16	-.20
44	-.08	-.06	.27	-.06	-.15	-.20	-.05	-.15	-.07	-.16	-.20

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Table 73

(Continued from Previous Page)

Variable Number											
	23	24	25	26	27	28	29	30	31	32	33
23	----										
24	.50	----									
25	.01	-.03	----								
26	.45	.37	.20	----							
27	.03	-.00	.25	.10	----						
28	.39	.35	.04	.27	.01	----					
29	-.15	-.24	.45	.05	.19	-.04	----				
30	.17	.23	-.07	.03	-.03	.11	-.22	----			
31	.73	.58	.38	.67	.38	.51	.27	.07	----		
32	-.10	-.01	-.04	.03	.06	-.00	-.09	-.16	-.06	----	
33	-.03	-.02	-.02	.01	-.07	-.04	-.04	-.02	-.06	.14	----
34	-.03	-.04	-.01	-.04	.01	-.08	-.07	.04	-.08	-.01	.18
35	-.05	.00	-.04	.01	-.03	-.01	-.09	.05	-.07	.09	.23
36	.02	-.03	-.05	-.01	-.04	.02	-.10	.00	-.06	.10	.19
37	-.03	-.03	-.04	-.01	-.05	-.04	-.11	.03	-.10	.11	.59
38	.05	-.01	.00	-.03	-.08	-.03	-.02	.14	-.03	-.67	.34
39	-.17	-.12	-.20	-.19	-.26	-.16	-.15	.04	-.33	.02	.14
40	.00	.00	-.03	.05	-.04	.04	-.07	-.05	-.02	.20	.17
41	-.02	.03	.02	.07	-.05	.03	-.04	-.03	-.01	.31	.23
42	.03	.04	-.03	.06	-.02	.04	-.08	-.02	.00	.20	.15
43	-.01	.02	-.01	.07	-.05	.04	-.07	-.05	-.02	.29	.23
44	.00	.03	-.02	.08	-.05	.05	-.08	-.05	-.02	.31	.24

(Continued on next page)



Table 73  
(Continued from Previous Page)

Variable Number											
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	.33	----									
36	.37	.40	----								
37	.68	.72	.72	----							
38	.52	.47	.46	.66	----						
39	.16	.13	.17	.22	.15	----					
40	.08	.16	.17	.21	.01	.07	----				
41	.06	.13	.10	.19	-.09	.10	.44	----			
42	.15	.17	.22	.25	.04	.04	.31	.23	----		
43	.08	.17	.17	.24	-.04	.09	.89	.80	.32	----	
44	.12	.20	.21	.28	-.02	.09	.85	.75	.60	.95	----

Table 74

Table of N's to Accompany Intercorrelations of the Independent and Dependent Variables for  
Subjects in the Combined Programed and Conventional Groups

	Variable Number										
	1	2	3	4	5	6	7	8	9	10	11
1	----										
2	861	----									
3	858	848	----								
4	845	834	830	----							
5	831	822	819	806	----						
6	808	796	794	783	768	----					
7	861	849	846	835	819	803	----				
8	812	800	798	786	772	802	802	----			
9	811	799	797	784	771	803	804	806	----		
10	1039	860	857	844	830	807	860	811	810	----	
11	753	744	741	731	718	693	741	699	696	753	----
12	732	722	720	711	699	669	720	674	672	731	698
13	872	860	858	844	830	807	800	811	810	871	753
14	1040	861	858	845	831	808	861	812	811	1040	753
15	1000	857	854	841	827	804	857	808	807	999	749
16	1000	857	854	841	827	804	857	808	807	999	749
17	1000	857	854	841	827	804	857	808	807	999	749
18	1000	857	854	841	827	804	857	808	807	999	749
19	1000	857	854	841	827	804	857	808	807	999	749
20	1000	857	854	841	827	804	857	808	807	999	749
21	1000	857	854	841	827	804	857	808	807	999	749
22	1000	857	854	841	827	804	857	808	807	999	749

(Continued on Next Page)

Table 74

(Continued from Previous Page)

	Variable Number											
	12	13	14	15	16	17	18	19	20	21	22	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12	----											
13	731	----										
14	732	872	----									
15	731	868	1000	----								
16	731	868	1000	1000	----							
17	731	868	1000	1000	1000	----						
18	731	868	1000	1000	1000	1000	----					
19	731	868	1000	1000	1000	1000	1000	----				
20	731	868	1000	1000	1000	1000	1000	1000	----			
21	731	868	1000	1000	1000	1000	1000	1000	1000	----		
22	731	868	1000	1000	1000	1000	1000	1000	1000	1000	----	

(Continued on Next Page)

Table 74

(Continued from Previous Page)

	<u>Variable Number</u>										
	1	2	3	4	5	6	7	8	9	10	11
23	1001	858	855	842	828	805	858	809	808	1000	751
24	1001	858	855	842	828	805	858	809	808	1000	751
25	1001	858	855	842	828	805	858	809	808	1000	751
26	1001	858	855	842	828	805	858	809	808	1000	751
27	1001	858	855	842	828	805	858	809	808	1000	751
28	1001	858	855	842	828	805	858	809	808	1000	751
29	1001	858	855	842	828	805	858	809	808	1000	751
30	1001	858	855	842	828	805	858	809	808	1000	751
31	1001	858	855	842	828	805	858	809	808	1000	751
32	945	831	829	813	801	776	829	781	780	944	726
33	945	831	829	813	801	776	829	781	780	944	726
34	945	831	829	813	801	776	829	781	780	944	726
35	945	831	829	813	801	776	829	781	780	944	726
36	945	831	829	813	801	776	829	781	780	944	726
37	945	831	829	813	801	776	829	781	780	944	726
38	945	831	829	813	801	776	829	781	780	944	726
39	1004	860	857	844	830	807	860	811	810	1003	753
40	1040	861	858	845	831	808	861	812	811	1040	753
41	1040	861	858	845	831	808	861	812	811	1040	753
42	1040	861	858	845	831	808	861	812	811	1040	753
43	1040	861	858	845	831	808	861	812	811	1040	753
44	1040	861	858	845	831	808	861	812	811	1040	753

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Table 74

(Continued from Previous Page)

	Variable Number										
	12	13	14	15	16	17	18	19	20	21	22
23	731	869	1001	997	997	997	997	997	997	997	997
24	731	869	1001	997	997	997	997	997	997	997	997
25	731	869	1001	997	997	997	997	997	997	997	997
26	731	869	1001	997	997	997	997	997	997	997	997
27	731	869	1001	997	997	997	997	997	997	997	997
28	731	869	1001	997	997	997	997	997	997	997	997
29	731	869	1001	997	997	997	997	997	997	997	997
30	731	869	1001	997	997	997	997	997	997	997	997
31	731	869	1001	997	997	997	997	997	997	997	997
32	702	840	945	937	937	937	937	937	937	937	937
33	702	840	945	937	937	937	937	937	937	937	937
34	702	840	945	937	937	937	937	937	937	937	937
35	702	840	945	937	937	937	937	937	937	937	937
36	702	840	945	937	937	937	937	937	937	937	937
37	702	840	945	937	937	937	937	937	937	937	937
38	702	840	945	937	937	937	937	937	937	937	937
39	731	871	1004	997	997	997	997	997	997	997	997
40	732	872	1041	1000	1000	1000	1000	1000	1000	1000	1000
41	732	872	1041	1000	1000	1000	1000	1000	1000	1000	1000
42	732	872	1041	1000	1000	1000	1000	1000	1000	1000	1000
43	732	872	1041	1000	1000	1000	1000	1000	1000	1000	1000
44	732	872	1041	1000	1000	1000	1000	1000	1000	1000	1000

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Table 74  
(Continued from Previous Page)

	<u>Variable Number</u>											
	23	24	25	26	27	28	29	30	31	32	33	
23	----											
24	1001	1000										
25	1001	1001	----									
26	1001	1001	1001	----								
27	1001	1001	1001	1001	----							
28	1001	1001	1001	1001	1001	----						
29	1001	1001	1001	1001	1001	1001	----					
30	1001	1001	1001	1001	1001	1001	1001	----				
31	1001	1001	1001	1001	1001	1001	1001	1001	----			
32	938	938	938	938	938	938	938	938	938	----		
33	938	938	938	938	938	938	938	938	938	945	----	
34	938	938	938	938	938	938	938	938	938	945	945	
35	938	938	938	938	938	938	938	938	938	945	945	
36	938	938	938	938	938	938	938	938	938	945	945	
37	938	938	938	938	938	938	938	938	938	945	945	
38	938	938	938	938	938	938	938	938	938	945	945	
39	998	998	998	998	998	998	998	998	999	944	944	
40	1001	1001	1001	1001	1001	1001	1001	1001	1001	945	945	
41	1001	1001	1001	1001	1001	1001	1001	1001	1001	945	945	
42	1001	1001	1001	1001	1001	1001	1001	1001	1001	945	945	
43	1001	1001	1001	1001	1001	1001	1001	1001	1001	945	945	
44	1001	1001	1001	1001	1001	1001	1001	1001	1001	945	945	

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Table 74

(Continued from Previous Page)

	Variable Number										
	34	35	36	37	38	39	40	41	42	43	44
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34	----										
35	945	----									
36	945	945	----								
37	945	945	945	----							
38	945	945	945	945	----						
39	944	944	944	944	944	----					
40	945	945	945	945	945	1004	----				
41	945	945	945	945	945	1004	1041	----			
42	945	945	945	945	945	1004	1041	1041	----		
43	945	945	945	945	945	1004	1041	1041	1041	----	
44	945	945	945	945	945	1004	1041	1041	1041	1041	----

APPENDIX I  
TABLES OF CRITERION TEST CELL MEANS TO ACCOMPANY THE ANALYSES  
OF VARIANCE TABLES IN SECTION THREE

This appendix contains the corresponding tables of criterion test means for the analyses of variance reported in Section 3 of the text. The tables are presented in the same order as in Section 3.



Table 75

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Constructive Compulsivity

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.09	8.16	4.08	19.33
	G	7.36	8.20	4.08	19.64
Mental Age	Lo	6.57	7.62	3.86	18.05
	Hi	7.87***	8.74***	4.29***	20.91***
Condition	Pro	6.22	8.05	3.87	18.15
	Con	8.22***	8.31	4.28**	20.82***
Constructive Compulsivity	Lo	7.11	8.09	4.04	19.25
	Hi	7.33	8.27	4.11	19.71
Sex x Mental Age	B Lo	6.36	7.47	3.79	17.61
	B Hi	7.81	8.86	4.37	21.04
	G Lo	6.73	7.78	3.94	18.50
	G Hi	7.93	8.63	4.21	20.78
Sex x Condition	B P	6.06	8.13	3.90	18.10
	B C	8.11	8.19	4.26	20.56
	G P	6.38	7.97	3.85	18.19
	G C	8.34	8.44	4.31	21.08
Sex x Const. Comp.	B Lo	7.00	8.08	4.09	19.17
	B Hi	7.17	8.25	4.07	19.49
	G Lo	7.23	8.11	4.00	19.34
	G Hi	7.49	8.29	4.16	19.94
Mental Age x Condition	L P	5.54	7.50	3.67	16.71
	L C	7.60	7.74	4.06	19.40
	H P	6.90	8.60	4.08	19.59
	H C	8.85	8.89	4.50	22.23
Mental Age x Const. Comp.	L Lo	6.54	7.64	3.87	18.05
	L Hi	6.60	7.60	3.86	18.06
	H Lo	7.69	8.54	4.22	20.45
	H Hi	8.06	8.94	4.37	21.37
Condition x Const. Comp.	P Lo	6.16	8.05	3.82	18.03
	P Hi	6.27	8.05	3.93	18.26
	C Lo	8.06	8.14	4.27	20.47
	C Hi	8.38	8.49	4.29	21.17

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 76

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Unconstructive Compulsivity

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.03	8.16	4.08	19.28
	G	7.37	8.16	4.10	19.63
Mental Age	Lo	6.53	7.60	3.87	18.00
	Hi	7.87***	8.73***	4.31***	20.91***
Condition	Pro	6.16	8.07	3.90	18.14
	Con	8.24***	8.25	4.28**	20.78***
Unconstructive Compulsivity	Lo	7.22	8.21	4.19	19.62
	Hi	7.18	8.12	3.99	19.30
Sex x Mental Age	B Lo	6.31	7.47	3.81	17.59
	B Hi	7.76	8.86	4.36	20.98
	G Lo	6.76	7.72	3.93	18.41
	G Hi	7.97	8.60	4.27	20.85
Sex x Condition	B P	6.02	8.15	3.93	18.10
	B C	8.05	8.18	4.24	20.47
	G P	6.30	8.00	3.87	18.17
	G C	8.43	8.33	4.33	21.09
Sex x Unconst. Comp.	B Lo	7.13	8.25	4.12	19.50
	B Hi	6.94	8.08	4.05	19.07
	G Lo	7.30	8.17	4.27	19.73
	G Hi	7.43	8.16	3.93	19.52
Mental Age x Condition	L P	5.40	7.49	3.65	16.54
	L C	7.67	7.70	4.09	19.46
	H P	6.92	8.65	4.16	19.73
	H C	8.81	8.81	4.47	22.09
Mental Age x Unconst. Comp.	L Lo	6.61	7.53	3.99	18.13
	L Hi	6.46	7.67	3.74	17.88
	H Lo	7.83	8.88	4.39	21.10
	H Hi	7.91	8.57	4.24	20.72
Condition x Unconst. Comp.	P Lo	6.18	8.16	4.07	18.41
	P Hi	6.14	7.98	3.74	17.86
	C Lo	8.25	8.25	4.32	20.82
	C Hi	8.23	8.26	4.24	20.73

\* .05 > p > .01

\*\* .01 > p > .005

\*\*\* .005 > p

Table 77

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Exhibitionism

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.07	8.22	4.07	19.36
	G	7.38	8.21	4.13	19.72
Mental Age	Lo	6.55***	7.62***	3.90***	18.07***
	Hi	7.90	8.81	4.30	21.01
Condition	Pro	6.17***	8.11	3.90***	18.17***
	Con	8.28	8.32	4.30	20.91
Exhibitionism	Lo	7.30	8.15	4.11	19.56
	Hi	7.15	8.27	4.09	19.52
Sex x Mental Age	B Lo	6.32	7.49	3.81	17.62
	B Hi	7.82	8.95	4.33	27.10
	G Lo	6.79	7.75	3.99	18.53
	G Hi	7.97	8.67	4.27	20.92
Sex x Condition	B P	6.06	8.21	3.86	18.13
	B C	8.08	8.22	4.29	20.59
	G P	6.27	8.00	3.94	18.21
	G C	8.49	8.42	4.32	21.24
Sex x Exhibitionism	B Lo	7.21	8.16	4.14	19.51
	B Hi	6.93	8.27	4.00	19.21
	G Lo	7.39	8.15	4.08	19.62
	G Hi	7.37	8.28	4.18	19.83
Mental Age x Condition	L P	5.45	7.51	3.66	16.62
	L C	7.66	7.73	4.13	19.52
	H P	6.88	8.70	4.13	19.72
	H C	8.91	8.91	4.48	22.30
Mental Age x Exhibitionism	L Lo	6.55	7.50	3.90	17.95
	L Hi	6.56	7.74	3.90	18.19
	H Lo	8.05	8.81	4.32	21.18
	H Hi	7.75	8.81	4.28	20.84
Condition x Exhibitionism	P Lo	6.06	8.05	3.81	17.92
	P Hi	6.27	8.17	3.98	18.42
	C Lo	8.54	8.26	4.41	21.21
	C Hi	8.03	8.38	4.20	20.61

\* .05 > p > .01

\*\* .01 > p > .005

\*\*\* .005 > p

Table 78

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Generalized School Anxiety

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	6.97	8.16	4.09	19.22
	G	7.37	8.16	4.12	19.65
Mental Age	Lo	6.56***	7.62***	3.91**	18.09***
	Hi	7.78	8.70	4.30	20.78
Condition	Pro	6.16	8.00	3.92	18.08
	Con	8.18***	8.32	4.29**	20.79***
Generalized School Anx.	Lo	7.32	8.39	4.13	19.84
	Hi	7.02	7.93*	4.08	19.03
Sex	B Lo	6.24	7.52	3.89	17.65
	B Hi	7.70	8.80	4.28	20.78
x Mental Age	G Lo	6.88	7.71	3.92	18.52
	G Hi	7.86	8.61	4.31	20.79
Sex	B P	5.96	8.05	3.92	17.94
	B P	7.98	8.26	4.26	20.49
x Condition	G P	6.35	7.95	3.91	18.22
	G C	8.39	8.37	4.33	21.09
Sex	B Lo	7.19	8.46	4.10	19.74
	B Hi	6.75	7.86	4.08	18.69
x Gen. Sch. Anx.	G Lo	7.46	8.33	4.16	19.94
	G Hi	7.29	8.00	4.08	19.37
Mental Age	L P	5.48	7.46	3.73	16.66
	L C	7.64	7.78	4.09	19.51
x Condition	H P	6.84	8.55	4.11	19.49
	H C	8.73	8.86	4.49	22.07
Mental Age	L Lo	6.75	7.87	4.01	18.63
	L Hi	6.37	7.36	3.81	17.54
x Gen. Sch. Anx.	H Lo	7.89	8.91	4.24	21.04
	H Hi	7.67	8.49	4.35	20.52
Condition	P Lo	6.25	8.25	3.97	18.47
	P Hi	6.07	7.76	3.86	17.69
x Gen. Sch. Anx.	C Lo	8.39	8.54	4.28	21.21
	C Hi	7.98	8.10	4.30	20.38

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p



Table 79

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and General Classroom Anxiety

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.05	8.16	4.08	19.29
	G	7.44	8.23	4.16	19.83
Mental Age	Lo	6.64***	7.64***	3.90***	18.18***
	Hi	7.85	8.75	4.35	20.95
Condition	Pro	6.17***	8.07	3.92***	18.16***
	Con	8.32	8.31	4.33	20.97
General Class- room Anxiety	Lo	7.52*	8.46***	4.20	20.18**
	Hi	6.97	7.93	4.04	18.94
Sex x Mental Age	B Lo	6.35	7.50	3.82	17.67
	B Hi	7.76	8.81	4.35	20.91
	G Lo	6.93	7.78	3.98	18.69
	G Hi	7.95	8.69	4.35	20.98
Sex x Condition	B P	6.02	8.11	3.89	18.02
	B C	8.09	8.20	4.28	20.56
	G P	6.32	8.04	3.94	18.30
	G C	8.55	8.43	4.39	21.37
Sex x Gen. C-R Anx.	B Lo	7.34	8.41	4.14	19.90
	B Hi	6.76	7.90	4.03	18.69
	G Lo	7.70	8.50	4.27	20.41
	G Hi	7.17	7.96	4.06	19.20
Mental Age x Condition	L P	5.46	7.48	3.70	16.64
	L C	7.81	7.80	4.10	19.71
	H P	6.87	8.67	4.14	19.68
	H C	8.83	8.83	4.56	22.22
Mental Age x Gen. C-R Anx.	L Lo	6.92	7.88	4.11	18.91
	L Hi	6.36	7.40	3.69	17.44
	H Lo	8.12	9.04	4.30	21.46
	H Hi	7.58	8.46	4.40	20.44
Condition x Gen. C-R Anx.	P Lo	6.41	8.28	3.99	18.69
	P Hi	5.92	7.86	3.85	17.63
	C Lo	8.62	8.63	4.42	21.68
	C Hi	8.02	8.00	4.24	20.25

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 80

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Parental Pressure for Achievement

Independent Variables		Criterion Means			
		Recall	Transfer	Hyp. Mak.	Total
Sex	B	7.12	8.15	4.16	19.43
	G	7.43	8.21	4.04	19.68
Mental Age	Lo	6.63***	7.61***	3.94*	18.19***
	Hi	7.92	8.75	4.26	20.93
Condition	Pro	6.20***	8.01	3.86***	18.08***
	Con	8.35	8.35	4.34	21.04
Par. Press. Achievement	Lo	7.50	8.30	4.30**	20.09*
	Hi	7.05	8.06	3.91	19.02
Sex x Mental Age	B Lo	6.37	7.46	4.00	17.83
	B Hi	7.87	8.84	4.33	21.04
	G Lo	6.90	7.76	3.89	18.55
	G Hi	7.96	8.66	4.19	20.81
Sex x Condition	B P	6.09	8.09	3.91	18.09
	B C	8.15	8.21	4.42	20.78
	G P	6.32	7.93	3.82	18.07
	G C	8.54	8.49	4.26	21.29
Sex x P. P. Achiev.	B Lo	7.44	8.25	4.43	20.12
	B Hi	6.80	8.05	3.90	18.75
	G Lo	7.56	8.35	4.16	20.07
	G Hi	7.31	8.07	3.91	19.29
Mental Age x Condition	L P	6.45	7.48	3.68	16.61
	L C	7.82	7.74	4.21	19.77
	H P	6.96	8.53	4.05	19.55
	H C	8.87	8.97	4.47	22.30
Mental Age x P. P. Achiev.	L Lo	6.96	7.75	4.21	18.92
	L Hi	6.31	7.46	3.68	17.45
	H Lo	8.03	8.85	4.39	21.27
	H Hi	7.80	8.65	4.13	20.59
Condition x P. P. Achiev.	P Lo	6.40	8.21	4.11	18.71
	P Hi	6.01	7.81	3.62	17.44
	C Lo	8.60	8.39	4.48	21.48
	C Hi	8.09	8.31	4.20	20.60

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 81

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Test Anxiety

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	6.96	8.13	4.08	19.16
	G	7.42	8.18	4.08	19.68
Mental Age	Lo	6.54***	7.56***	3.87***	17.97***
	Hi	7.84	8.75	4.28	20.87
Condition	Pro	6.15***	8.05	3.91*	18.10***
	Con	8.23	8.26	4.25	20.74
Test Anxiety	Lo	7.30	8.35*	4.18	19.83
	Hi	7.07	7.96	3.98	19.01
Sex x Mental Age	B Lo	6.20	7.41	3.86	17.48
	B Hi	7.71	8.84	4.30	20.85
	G Lo	6.87	7.71	3.89	18.47
	G Hi	7.96	8.65	4.27	20.89
Sex x Condition	B P	5.98	8.07	3.91	17.97
	B C	7.93	8.18	4.24	20.36
	G P	6.31	8.02	3.91	18.24
	G C	8.52	8.34	4.25	21.12
Sex x Test Anx.	B Lo	7.20	8.41	4.23	19.83
	B Hi	6.72	7.85	3.93	18.49
	G Lo	7.41	8.29	4.13	19.83
	G Hi	7.43	8.07	4.03	19.53
Mental Age x Condition	L P	5.46	7.48	3.69	16.63
	L C	7.61	7.64	4.06	19.31
	H P	6.83	8.61	4.14	19.58
	H C	8.84	8.89	4.43	22.16
Mental Age x Test Anx.	L Lo	6.70	7.81	4.03	18.54
	L Hi	6.37	7.31	3.72	17.41
	H Lo	7.90	8.89	4.33	21.12
	H Hi	7.77	8.61	4.24	20.62
Condition x Test Anx.	P Lo	6.26	8.30	3.97	18.54
	P Hi	6.03	7.79	3.85	17.67
	C Lo	8.34	8.39	4.38	21.12
	C Hi	8.11	8.13	4.11	20.36

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 82

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Peer Anxiety

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.01	8.16	4.03	19.19
	G	7.29	8.20	4.09	19.59
Ment. Age	Lo	6.48***	7.58***	3.77***	17.83***
	Hi	7.83	8.78	4.35	20.96
Condition	Pro	6.12***	8.00	3.87**	17.99***
	Con	8.19	8.36	4.24	20.79
Peer Anxiety	Lo	7.09	8.29	4.12	19.49
	Hi	7.22	8.07	4.00	19.29
Sex x Mental Age	B Lo	6.23	7.42	3.69	17.34
	B Hi	7.80	8.89	4.36	21.05
	G Lo	6.72	7.74	3.85	18.32
	G Hi	7.87	8.66	4.33	20.86
Sex x Condition	B P	6.01	8.06	3.86	17.93
	B C	8.01	8.25	4.19	20.45
	G P	6.23	7.94	3.88	18.05
	G C	8.36	8.47	4.30	21.13
Sex x Peer Anxiety	B Lo	6.96	8.16	4.06	19.17
	B Hi	7.07	8.15	3.99	19.21
	G Lo	7.22	8.41	4.18	19.82
	G Hi	7.37	7.99	4.01	19.36
Mental Age x Condition	L P	5.39	7.39	3.59	16.37
	L C	7.56	7.77	3.95	19.29
	H P	6.85	8.61	4.16	19.62
	H C	8.81	8.95	4.54	22.30
Mental Age x Peer Anxiety	L Lo	6.48	7.73	3.76	17.97
	L Hi	6.47	7.43	3.78	17.68
	H Lo	7.71	8.84	4.48	21.02
	H Hi	7.96	8.71	4.22	20.90
Condition x Peer Anxiety	P Lo	6.09	8.09	4.01	18.19
	P Hi	6.15	7.91	3.74	17.79
	C Lo	8.09	8.48	4.23	20.80
	C Hi	8.28	8.24	4.26	20.78

\* .05 > p > .01

\*\* .01 > p > .005

\*\*\* .005 > p



Table 83

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Teacher Anxiety

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	6.94	8.14	4.10	19.18
	G	7.33	8.17	4.09	19.59
Mental Age	Lo	6.48***	7.58***	3.92*	17.98***
	Hi	7.79***	8.73***	4.27*	20.79***
Condition	Pro	6.08	8.02	3.85	17.95
	Con	8.19***	8.29	4.35***	20.83***
Teacher Anxiety	Lo	7.10	8.21	4.18	19.50
	Hi	7.17	8.10	4.01	19.28
Sex x Mental Age	B Lo	6.24	7.45	3.88	17.57
	B Hi	7.64	8.83	4.32	20.79
	G Lo	6.72	7.71	3.96	18.39
	G Hi	7.94	8.63	4.23	20.79
Sex x Condition	B P	5.95	8.10	3.83	17.88
	B C	7.93	8.19	4.37	20.49
	G P	6.20	7.95	3.86	18.01
	G C	8.46	8.39	4.33	21.17
Sex x Teach. Anx.	B Lo	7.08	8.23	4.21	19.52
	B Hi	6.80	8.05	4.00	18.85
	G Lo	7.13	8.19	4.16	19.47
	G Hi	7.53	8.15	4.03	19.71
Mental Age x Condition	L P	5.32	7.52	3.66	16.50
	L C	7.64	7.64	4.18	19.46
	H P	6.83	8.53	4.03	19.39
	H C	8.75	8.93	4.52	22.20
Mental Age x Teach. Anx.	L Lo	6.38	7.65	4.08	18.11
	L Hi	6.58	7.50	3.76	17.85
	H Lo	7.83	8.76	4.29	20.88
	H Hi	7.75	8.70	4.26	20.71
Condition x Teach. Anx.	P Lo	6.14	8.16	3.96	18.25
	P Hi	6.01	7.89	3.73	17.64
	C Lo	8.07	8.26	4.41	20.74
	C Hi	8.32	8.31	4.29	20.92

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 84

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and General Emotionality

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.12	8.16	4.07	19.35
	G	7.39	8.22	4.09	19.70
Mental Age	Lo	6.61***	7.63***	3.89**	18.13***
	Hi	7.90	8.75	4.27	20.91
Condition	Pro	6.25***	8.03	3.86***	18.14***
	Con	8.25	8.35	4.30	20.90
General Emotionality	Lo	7.30	8.35	4.15	19.80
	Hi	7.21	8.04	4.01	19.25
Sex x Mental Age	B Lo	6.38	7.51	3.87	17.76
	B Hi	7.85	8.82	4.27	20.94
	G Lo	6.83	7.76	3.92	18.51
	G Hi	7.94	8.68	4.27	20.89
Sex x Condition	B P	6.15	8.06	3.87	18.09
	B C	8.08	8.27	4.26	20.61
	G P	6.34	8.00	3.85	18.19
	G C	8.43	8.44	4.33	21.20
Sex x Gen. Emot.	B Lo	7.21	8.27	4.13	19.61
	B Hi	7.02	8.06	4.00	19.08
	G Lo	7.38	8.43	4.17	19.98
	G Hi	7.39	8.01	4.02	19.42
Mental Age x Condition	L P	5.56	7.51	3.63	16.69
	L C	7.65	7.76	4.16	19.57
	H P	6.94	8.55	4.10	19.59
	H C	8.86	8.95	4.44	22.24
Mental Age x Gen. Emot.	L Lo	6.62	7.74	3.94	18.30
	L Hi	6.60	7.53	3.84	17.96
	H Lo	7.98	8.96	4.36	21.29
	H Hi	7.82	8.54	4.18	20.54
Condition x Gen. Emot.	P Lo	6.29	8.25	3.95	18.49
	P Hi	6.21	7.81	3.77	17.79
	C Lo	8.31	8.44	4.35	21.10
	C Hi	8.20	8.26	4.25	20.71

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 85

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Anxiety Total

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.01	8.17	4.07	19.25
	G	7.44	8.18	4.13	19.76
Mental Age	Lo	6.59***	7.61***	3.87***	18.06***
	Hi	7.87	8.75	4.33	20.95
Condition	Pro	6.19***	8.07	3.93*	18.18***
	Con	8.27	8.29	4.28	20.83
Anxiety Total	Lo	7.40	8.40**	4.17	19.97*
	Hi	7.06	7.96	4.03	19.05
Sex x Mental Age	B Lo	6.24	7.48	3.78	17.50
	B Hi	7.78	8.86	4.36	21.00
	G Lo	6.93	7.73	3.96	18.62
	G Hi	7.96	8.64	4.31	20.90
Sex x Condition	B P	6.05	8.13	3.91	18.09
	B C	7.98	8.21	4.23	20.41
	G P	6.33	8.00	3.94	18.27
	G C	8.56	8.37	4.32	21.25
Sex x Anx. Tot.	B Lo	7.19	8.45	4.09	19.73
	B Hi	6.83	7.90	4.04	18.77
	G Lo	7.61	8.35	4.24	20.20
	G Hi	7.28	8.02	4.03	19.32
Mental Age x Condition	L P	5.50	7.52	3.67	16.69
	L C	7.67	7.69	4.07	19.43
	H P	6.88	8.61	4.19	19.67
	H C	8.86	8.89	4.48	22.23
Mental Age x Anx. Tot.	L Lo	6.81	7.84	4.02	18.67
	L Hi	6.36	7.38	3.71	17.45
	H Lo	7.99	8.96	4.31	21.26
	H Hi	7.75	8.54	4.36	20.64
Condition x Anx. Tot.	P Lo	6.40	8.34	4.00	18.74
	P Hi	5.98	7.79	3.85	17.63
	C Lo	8.41	8.45	4.34	21.20
	C Hi	8.13	8.13	4.22	20.47

\* .05 > p > .01

\*\* .01 > p > .005

\*\*\* .005 > p

Table 86

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Imagination

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.13	8.22	4.09	19.44
	G	7.42	8.21	4.03	19.66
Mental Age	Lo	6.61	7.66	3.82	18.10
	Hi	7.93***	8.77***	4.29***	20.99***
Condition	Pro	6.28	8.11	3.87	18.25
	Con	8.27***	8.33	4.25*	20.84***
Imagination	Lo	7.25	8.04	3.86	19.15
	Hi	7.29	8.39*	4.26**	19.95
Sex	B Lo	6.42	7.60	3.81	17.83
	B Hi	7.83	8.85	4.37	21.05
x Mental Age	G Lo	6.81	7.73	3.84	18.38
	G Hi	8.02	8.70	4.21	20.94
Sex	B P	6.22	8.19	3.93	18.33
	B C	8.03	8.26	4.25	20.55
x Condition	G P	6.33	8.03	3.81	18.17
	G C	8.50	8.40	4.24	21.14
Sex	B Lo	7.00	7.93	3.78	18.72
	B Hi	7.25	8.52	4.40	20.16
x Imagination	G Lo	7.49	8.16	3.93	19.58
	G Hi	7.34	8.27	4.12	19.73
Mental Age	L P	5.54	7.53	3.59	16.65
	L C	7.69	7.80	4.06	19.55
x Condition	H P	7.01	8.69	4.15	19.85
	H C	8.84	8.86	4.43	22.14
Mental Age	L Lo	6.48	7.44	3.61	17.53
	L Hi	6.75	7.89	4.04	18.68
x Imagination	H Lo	8.02	8.65	4.10	20.77
	H Hi	7.84	8.90	4.48	21.22
Condition	P Lo	6.25	7.87	3.74	17.87
	P Hi	6.30	8.34	4.00	18.64
x Imagination	C Lo	8.24	8.21	3.97	20.43
	C Hi	8.29	8.45	4.52	21.26

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p



Table 87

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Creativity Total Minus Convergent Thinking

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.00	8.09	4.03	19.12
	G	7.45	8.21	4.03	19.69
Mental Age	Lo	6.62***	7.59***	3.80***	18.02***
	Hi	7.83	8.71	4.26	20.80
Condition	Pro	6.17	7.98	3.88	18.03
	Con	8.28***	8.32	4.19	20.79***
Creativity T. -Conv. Think.	Lo	7.31	8.39*	4.01	19.71
	Hi	7.14	7.91	4.06	19.11
Sex x Mental Age	B Lo	6.33	7.41	3.73	17.47
	B Hi	7.68	8.76	4.34	20.78
	G Lo	6.92	7.77	3.88	18.57
	G Hi	7.98	8.65	4.19	20.82
Sex x Condition	B P	6.02	8.06	3.95	18.02
	B C	7.99	8.12	4.12	20.23
	G P	6.33	7.89	3.81	18.03
	G C	8.57	8.52	4.26	21.35
Sex x Cr. T.-Con. T.	B Lo	6.99	8.31	4.03	19.33
	B Hi	7.02	7.87	4.04	18.92
	G Lo	7.64	8.46	3.98	20.08
	G Hi	7.26	7.95	4.09	19.30
Mental Age x Condition	L P	5.44	7.40	3.64	16.48
	L C	7.81	7.78	3.97	19.55
	H P	6.91	8.55	4.12	19.57
	H C	8.75	8.86	4.41	22.02
Mental Age x Cr. T.-Con. T.	L Lo	6.80	7.87	3.73	18.39
	L Hi	6.45	7.32	3.88	17.64
	H Lo	7.83	8.91	4.28	21.02
	H Hi	7.83	8.50	4.24	20.58
Condition x Cr. T.-Con. T.	P Lo	6.30	8.19	3.87	18.36
	P Hi	6.05	7.76	3.89	17.69
	C Lo	8.33	8.58	4.14	21.05
	C Hi	8.23	8.06	4.24	20.53

\* .05 > p > .01

\*\* .01 > p > .005

\*\*\* .005 > p

Table 88

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Flexibility

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.00	8.15	4.05	19.19
	G	7.42	8.15	4.05	19.62
Mental Age	Lo	6.55***	7.56***	3.80***	17.91***
	Hi	7.87	8.73	4.30	20.90
Condition	Pro	6.18***	7.97	3.90*	18.05***
	Con	8.24	8.32	4.21	20.76
Flexibility	Lo	7.18	8.21	3.88*	19.27
	Hi	7.24	8.09	4.22	19.54
Sex x Mental Age	B Lo	6.25	7.45	3.69	17.39
	B Hi	7.74	8.84	4.41	20.99
	G Lo	6.85	7.67	3.92	18.43
	G Hi	7.99	8.63	4.19	20.81
Sex x Condition	B P	6.01	8.08	3.97	18.06
	B C	7.99	8.21	4.12	20.32
	G P	6.36	7.86	3.82	18.03
	G C	8.49	8.43	4.29	21.21
Sex x Flexibility	B Lo	6.92	8.14	3.81	18.87
	B Hi	7.07	8.15	4.29	19.51
	G Lo	7.45	8.27	3.95	19.67
	G Hi	7.40	8.02	4.16	19.58
Mental Age x Condition	L P	5.44	7.39	3.67	16.50
	L C	7.66	7.72	3.94	19.32
	H P	6.92	8.55	4.12	19.60
	H C	8.81	8.92	4.47	22.21
Mental Age x Flexibility	L Lo	6.45	7.71	3.60	17.75
	L Hi	6.66	7.41	4.01	18.07
	H Lo	7.92	8.70	4.16	20.79
	H Hi	7.81	8.76	4.44	21.01
Condition x Flexibility	P Lo	6.15	7.96	3.73	17.83
	P Hi	6.22	7.98	4.06	18.26
	C Lo	8.22	8.45	4.03	20.71
	C Hi	8.26	8.19	4.38	20.82

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 89

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Originality

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.04	8.24	4.01	19.30
	G	7.42	8.22	4.03	19.66
Mental Age	Lo	6.59	7.66	3.78	18.03
	Hi	7.87***	8.79***	4.26***	20.92***
Condition	Pro	6.18***	8.09	3.85*	18.13***
	Con	8.28***	8.36	4.19*	20.83***
Originality	Lo	7.29	8.09	3.82***	19.19
	Hi	7.17	8.37	4.22***	19.76
Sex x Mental Age	B Lo	6.34	7.60	3.68	17.61
	B Hi	7.75	8.88	4.35	20.98
	G Lo	6.84	7.73	3.89	18.46
	G Hi	7.99	8.70	4.17	20.86
Sex x Condition	B P	6.06	8.21	3.84	18.11
	B C	8.03	8.26	4.18	20.48
	G P	6.31	7.97	3.87	18.15
	G C	8.52	8.46	4.19	21.17
Sex x Originality	B Lo	7.14	8.11	3.74	18.98
	B Hi	6.95	8.37	4.29	19.61
	G Lo	7.44	8.06	3.90	19.40
	G Hi	7.39	8.37	4.16	19.92
Mental Age x Condition	L P	5.44	7.55	3.60	16.59
	L C	7.74	7.78	3.96	19.47
	H P	6.92	8.64	4.11	19.67
	H C	8.82	8.94	4.41	22.18
Mental Age x Originality	L Lo	6.59	7.39	3.61	17.58
	L Hi	6.59	7.94	3.95	18.48
	H Lo	7.99	8.79	4.02	20.80
	H Hi	7.75	8.80	4.50	21.05
Condition x Originality	P Lo	6.32	7.90	3.58	17.79
	P Hi	6.05	8.29	4.13	18.47
	C Lo	8.26	8.27	4.06	20.59
	C Hi	8.30	8.45	4.31	21.06

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

Table 90

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Fluency

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.06	8.24	4.06	19.35
	G	7.39	8.22	4.07	19.68
Mental Age	Lo	6.56	7.71	3.82	18.10
	Hi	7.88***	8.75***	4.30***	20.93***
Condition	Pro	6.20***	8.08	3.87**	18.15***
	Con	8.24***	8.38	4.26**	20.89***
Fluency	Lo	7.30	8.27	3.95	19.52
	Hi	7.15	8.19	4.17	19.51
Sex x Mental Age	B Lo	6.35	7.64	3.72	17.71
	B Hi	7.76	8.84	4.39	21.00
	G Lo	6.77	7.79	3.93	18.49
	G Hi	8.00	8.66	4.21	20.87
Sex x Condition	B P	6.07	8.14	3.88	18.09
	B C	8.04	8.34	4.23	20.62
	G P	6.33	8.02	3.85	18.20
	G C	8.45	8.42	4.28	21.15
Sex x Fluency	B Lo	6.98	8.26	3.94	19.19
	B Hi	7.13	8.21	4.18	19.52
	G Lo	7.61	8.27	3.97	19.86
	G Hi	7.16	8.17	4.16	19.50
Mental Age x Condition	L P	5.46	7.54	3.65	16.65
	L C	7.67	7.89	4.00	19.55
	H P	6.94	8.62	4.09	19.65
	H C	8.82	8.88	4.51	22.22
Mental Age x Fluency	L Lo	6.69	7.70	3.80	18.20
	L Hi	6.43	7.73	3.85	18.01
	H Lo	7.90	8.84	4.11	20.85
	H Hi	7.86	8.66	4.49	21.02
Condition x Fluency	P Lo	6.24	8.16	3.72	18.12
	P Hi	6.16	8.00	4.02	18.18
	C Lo	8.35	8.38	4.19	20.92
	C Hi	8.14	8.38	4.33	20.5

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p



Table 91

Criterion Test Means from the Analyses of Variance for  
Subjects Classified on the Basis of Sex, Mental Age,  
Instructional Condition, and Creativity Total

<u>Independent Variables</u>		<u>Criterion Means</u>			
		<u>Recall</u>	<u>Transfer</u>	<u>Hyp. Mak.</u>	<u>Total</u>
Sex	B	7.09	8.20	4.15	19.44
	G	7.38	8.24	4.05	19.67
Mental Age	Lo	6.58	7.66	3.90	18.15
	Hi	7.89***	8.78***	4.29**	20.97***
Condition	Pro	6.18	8.06	3.89	18.13
	Con	8.29***	8.39	4.30***	20.99***
Creativity Total	Lo	7.23	8.14	3.97	19.17
	Hi	7.24	8.30	4.40***	19.95
Sex	B Lo	6.40	7.57	3.84	17.81
	B Hi	7.78	8.84	4.45	21.07
x Mental Age	G Lo	6.76	7.75	3.97	18.48
	G Hi	8.00	8.73	4.13	20.86
Sex	B P	6.10	8.16	3.97	18.23
	B P	8.09	8.25	4.32	20.66
x Condition	G P	6.26	7.96	3.81	18.03
	G C	8.50	8.52	4.29	21.31
Sex	B Lo	7.02	8.11	3.75	18.88
	B Hi	7.17	8.29	4.54	20.00
x Creat. Tot.	G Lo	7.45	8.17	3.83	19.45
	G Hi	7.31	8.31	4.27	19.89
Mental Age	L P	5.40	7.51	3.66	16.57
	L C	7.77	7.82	4.13	19.72
x Condition	H P	6.96	8.61	4.12	19.69
	H C	8.82	8.96	4.47	22.25
Mental Age	L Lo	6.58	7.39*	3.56	17.53
	L Hi	6.58	7.93	4.25	18.76
x Creat. Tot.	H Lo	7.89	8.89	4.02	20.81
	H Hi	7.90	8.67	4.56	21.13
Condition	P Lo	6.16	7.95	3.61	17.71
	P Hi	6.20	8.17	4.18	18.55
x Creat. Tot.	C Lo	8.31	8.34	3.98	20.63
	C Hi	8.28	8.44	4.63	21.35

\* .05 &gt; p &gt; .01

\*\* .01 &gt; p &gt; .005

\*\*\* .005 &gt; p

## APPENDIX J

### A SAMPLE COPY OF THE DEVICE USED FOR TEACHER RATINGS OF THE FOUR STUDENT PERSONALITY CHARACTERISTICS

As every teacher is aware, children differ widely in a great variety of characteristics. Many student characteristics may presently be measured in a standardized fashion and such procedures often play an important role in decisions affecting the educational program of many students in our public schools. The present availability of these educationally useful tests is based on many years of careful research.

In connection with our research in your school, we will be administering four tests which have some relationship to this body of research and to the way in which these tests are presently used in the school situation and in contemporary research. As you will recall, the tests we will be administering are designed to measure four student characteristics titled: exhibitionism, compulsivity, creativity and anxiety.

One of the purposes of this testing is to determine if these student characteristics are related to learning in the classroom. This is a relatively new approach to relating student's characteristics to learning since past research has generally focused on such characteristics as IQ and other more specific measures of the cognitive functions of student behavior. In contrast to the latter approach, the project in which you have been participating has been concerned with different dimensions of student characteristics -- those which are ordinarily considered under the term personality. Through our research in this direction, we hope to gain an increased understanding of this relatively untouched sphere of student behavior in its relationship to classroom learning.

These four student characteristic measures which will be administered to your class have already undergone considerable refinement based on testing of nearly 5000 eighth graders during the first year of our research. The final stage of our test refinement procedures has been planned for this year and it is at this time that we would like to directly involve the teachers who are participating in our research.

To complete this stage of our research, we would like to enlist each of our cooperating teachers in the role of scientific observer. Each of the student characteristic measures are somewhat indirect measures of behaviors which occur in diverse forms in the school and in other situations. What is needed to

complete the research on these measures is an objective assessment of the live classroom behaviors which are expected to be related to student's scores on these measures.

In order to accomplish this goal, we have prepared a rating device and a definition for teacher ratings of each of the four student characteristics which play a central in our research. Each definition describes several observable classroom behaviors which are related to a specific student characteristic. The rating device and definitions are attached with this letter, and in addition, an addressed stamped envelope will be provided to facilitate return of the completed rating material. We have estimated the time for completing a single rating as approximately 20 minutes.

For the purposes of the research, it is important to maintain some standardization of the teacher ratings across the many schools involved in the project. An important element in this respect is the time when the ratings are completed. From our research point of view, the best time to do the ratings is on or around the time when the student characteristics measures are administered. The specific details concerning time of rating will be discussed with you by our project representative.

It is understood that some of the ratings on the four student characteristics will be difficult, but you are asked to reach a decision for each child in your class for each of the characteristics. Since it is not practical to list a great many behaviors defining each characteristic, it is possible for you to use any particular definition only in a general sense. Other behaviors which you may observe which appear to fit a given definition may undoubtedly aid you in making the ratings. It is also expected that your past experience with the child in the classroom situation will also be valuable in this respect. However, we would like to emphasize the importance of direct observation of live classroom behavior relevant to the definitions provided.

We sincerely thank you for your cooperation. In any study involving children in the school context, it is obvious that the observations which the teacher makes are extremely important. Without your cooperation, a most important source of data in our cooperative research venture would be missing.

Very truly yours,

Richard E. Ripple, Director  
Learning Structures Project

RER:RPO:ph

## TEACHER RATING OF STUDENT CHARACTERISTICS

You should have a pack of student data cards for your class(es) and the learner characteristics definitions.

- A. Thoroughly familiarize yourself with the exhibitionism definition.
- B. Divide the cards into five equal piles ranging from most like the definition to least like the definition. This is most easily accomplished as follows:
  1. Arrange the numbers 1 to 5 (written on scrap paper) across your desk.
  2. Choose that 20 percent of the students most like the definition and put their cards under Number 5. Note: Since most classes won't divide evenly by 5, put all extra cards in the middle (Pile 3). e.g.: 24 students, 4 per pile, 4 additional in middle pile.
  3. Choose the fifth least like the definition and put their cards under Number 1.
  4. Do the same for the next most like the definition (Pile 4),
  5. and then next least (Pile 2).
  6. The rest of the cards will be neutral to the definition and go under Number 3.
- C. Marking the cards (with an I.B.M. pencil):
  1. You'll see 5 columns marked A, B, C, D, and E.
  2. In column B (for exhibitionism) mark the number of the pile that each card is in.
- D. Follow the same procedures for each of the other characteristics using
  - column A for Anxiety
  - B for Exhibitionism
  - C for Compulsivity
  - D for Divergent thinking (Creativity).Column E will be blank.



## DEFINITION OF CREATIVE BEHAVIOR

Part A presents several short descriptions of how creative students usually act, which should help you in your ranking of students. Part B presents a general description of the creative student's composition work. You will note that the kinds of behavior described can generally be observed best in the open-ended discussion type of class.

### A. Creative students typically:

like to do their own planning, making their own decisions, and need the least training and experience in self-guidance.

do not like to work with others, and prefer their own judgement of their work to the judgement of others. They therefore seldom ask other students (or their teachers) for their opinions in this respect.

take a hopeful outlook when presented with complex difficult tasks.

have the most ideas when a chance to express individual opinion is presented. These ideas frequently invoke the ridicule of the class.

are much more likely to stand their ground in the face of criticism.

are the most resourceful when unusual circumstances arise.

can tolerate uncertainty and ambiguity better than others.

are not necessarily the "smartest" or "best" students.

### B. In their compositions, creative students typically:

show an imaginative use of many different words.

are more flexible, e.g., in a narrative, they use more situations, characters, and settings. Rather than taking one clearly defined train of thought and pursuing it to its logical conclusion, creative students tend to switch the main focus quickly and easily, and often go off on tangents.

tend to elaborate on the topic assigned, taking a much broader connotation of it to begin with, and then proceed to embellish even that.

are more original. (This is the most important characteristic. The others need not be evidenced, but this one must be.) This student's ideas are simply different from the average student's response. Perhaps you might react to the creative student's work in this way: "I know what most of the kids will do with the topic, but I never know what to expect from this one!"

### COMPULSIVITY

Children who are compulsive generally:

- want to finish a job completely
- hate to leave "loose ends"
- want things very definite and spelled out
- don't like a lot of changing or shifting
- like a schedule, a routine for doing things
- get upset or disturbed if their usual way of doing things gets disrupted
- emphasize neatness, having things just so, perfection
- follow instructions meticulously
- need to be right
- are usually very careful of hurting themselves
- are sometimes too cautious -- don't want to do or say anything wrong
- sometimes get "stalled" because something isn't just right; they can't go on, with this bothering them.

Although these attributes often times lead to good grades, they don't always. Choose children from those most generally having these attributes to those least generally having these attributes.

Table 92

Anxiety Definition

On the left are listed several classroom situations, which may conceivably elicit anxiety.  
On the right are student behaviors which may occur as reactions to these situations.

A. CLASSROOM SITUATIONS	B. OBSERVED BEHAVIORS INDICATING ANXIETY
1) TESTS	
a) before, during and shortly after taking teacher-made examinations, standardized tests (e.g., achievement exams)	1. Fidgeting, squirming, nail biting, head scratching.
	2. Complaints about frequency of testing.
	3. Often absent on test days but normally present for regular sessions.
	4. Expresses desire to use bathroom before or after test.
2) RECITATION	
a) writing on blackboard	1. Stammering, stuttering, speed-up in verbalizations; verbalizations become progressively disorganized; may become unable to answer (onset of emotion).
b) oral reports	
c) answering teacher-directed questions particularly questions directed at ascertaining student's knowledge of assignment or something student is expected to know.	2. Trembling, increased perspiration. Evidence of confusion (progressive). Desires not to compete in audience situation.

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Table 92  
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A. CLASSROOM SITUATIONS	B. OBSERVED BEHAVIORS INDICATING ANXIETY
3) DISCIPLINE	
a) disciplinary actions by teacher for incomplete assignments, careless work, irresponsible behavior	1. Student's orientation is very defensive -- attempts to give an explanation for any shortcomings whether real or not.
b) actions by teacher not intended as disciplinary but perceived by student as such (e.g., telling student he has made a mistake)	2. Becomes emotionally affected by teacher's comments; more disoriented by teacher comments than would be normally expected.
4) INTERPERSONAL RELATIONS WITH PEERS	
a) during group discussions, project work, etc.	1. Quick to anger, cry or in other ways show sensitivity to students' comments.
b) reactions to public comments made in class by other students	2. Perceives derogations or criticisms in situations which are easily judged as noncritical or nonthreatening.
c) other classroom situations involving student-student interactions	3. Expresses concern over relations with peers.
5) EVALUATION	
a) receipt of test marks	1. Shows frequent concern over school progress; cries or in other ways shows emotionality over report card marks, etc.
b) receipt of report card	
c) other activities in which the student's academic performance is formally evaluated	2. Expresses concern over parental reactions to school grades

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Table 92  
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A. CLASSROOM SITUATIONS	B. OBSERVED BEHAVIORS INDICATING ANXIETY
6) SEATWORK	
a) assignments completed in class	
b) assignments with a time limit completed in class	1. Unable to keep at school tasks consistently; spends much classroom time looking around the room, fidgeting, and in other ways escaping from the task.